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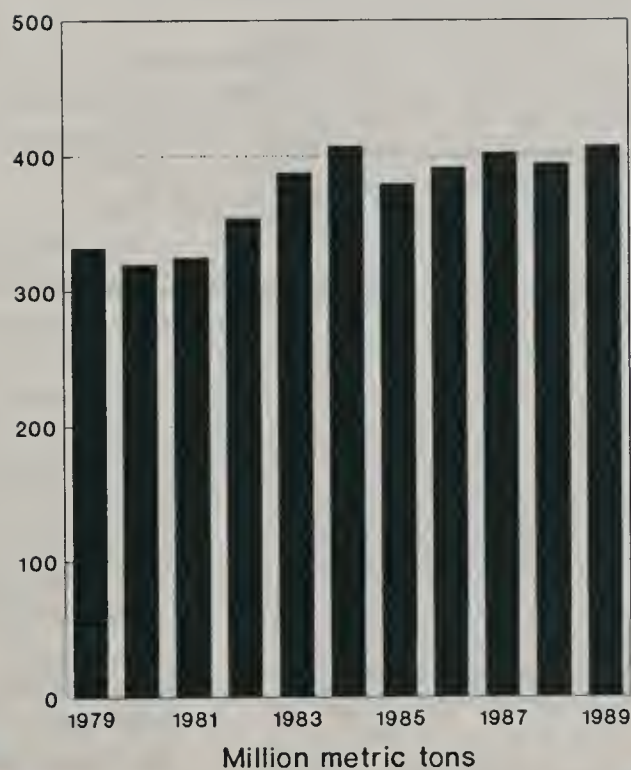
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China

Agriculture and Trade Report

Situation and Outlook Series

A Decade of Rising Grain Production



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Summary

China farm output up, U.S. exports decline

U.S. agricultural exports to China in fiscal 1990 are expected to decline 20 percent to \$1.2 billion from the previous year's \$1.5 billion, primarily from reduced wheat shipments and lower prices. During the last June/May marketing year, China purchased 5.6 million tons of U.S. wheat, compared with 8.1 million the previous year.

Total grain production for calendar 1989 hit a record 407 million tons, up 2.1 percent from 1988. Planted area expanded 1.9 percent to 112 million hectares. Generally good weather and increased inputs raised yields 0.2 percent. Wheat production was up 6.3 percent to a record 90.8 million metric tons, and rice output climbed 6.5 percent to a high of 180.1 million tons.

For 1990, total grain output is projected to range between 407 and 415 million tons with expanded area and improved yields. A record 97-million ton summer grain crop has already been harvested and as of mid-July prospects looked good for a bumper fall crop, possibly 310-318 million tons.

Reduced area and yields cut oilseed production in 1989 by 7 percent to 28.5 million tons. Drought in Manchuria and the North China Plain limited peanut and soybean yields. In 1990, oilseeds should rise 2.8 percent from more area planted to rapeseed, cottonseed, and peanuts. A winter rapeseed crop of 6 million tons has been harvested, up 15 percent from 1989.

Cotton outturn last year fell to 3.79 million tons, 8.9 percent below 1988 because of poor weather and reduced yields stemming from less input use. A yield of 728 kilograms per hectare was the lowest since 1982.

A nearly 27-percent price increase announced in late 1989 for 1990 delayed cotton procurement as farmers held on to their crop. By yearend, the government had purchased less than 80 percent of the crop, compared with 91 percent in 1988. However, the price rise has stimulated production. Seeded area is expected to increase 5.7 percent to 5.5 million hectares and output will likely reach 4.57 million tons.

Meat output was a record 23.3 million tons in 1989, 6 percent over 1988. Pork expanded by more than 1 million tons, well above the 200,000-ton target. Poultry meat rose almost 17 percent to 3.2 million tons. Meat output this year will grow more slowly, about 2 percent, because of feed shortage.

Government austerity programs in 1989 slowed the rate of inflation, but restricted the growth of rural enterprises which forced many former farmers back onto the land. Credit

restrictions also made it difficult for government agencies to buy agricultural products. In some cases IOU's were issued and there were instances where purchasing stations closed their doors, actions which angered farmers seeking to sell their products.

Lack of investment was a major constraint on China's agricultural development in the 1980's. The principle manager of capital funds in rural areas, the Agricultural Bank of China, has been ineffective in promoting development. Instead, more than three-quarters of the bank's loans went to rural enterprises and to support government procurement of farm products.

Throughout the 1980's foreign assistance played a major role in funding agricultural development projects. Since 1980, China has received over \$2 billion from the World Bank. Assistance has also come from the Asian Development Bank, the Overseas Economic Cooperation Fund (Japan), the Ford Foundation, the United Nations Development Programme, and the European Community. However, the Tiananmen Square incident in June 1989 delayed many agricultural loans by foreign lenders and reduced nonagricultural ones, most importantly those for fertilizer plants.

China's state-controlled agricultural trade expanded at an average annual rate of close to 12 percent between 1983 and 1989. Exports, such as corn, cotton, oilseeds, and livestock products, exceeded imports of wheat, sugar, and edible oils so that the agricultural sector was able to provide foreign exchange earnings to buy advanced industrial equipment and technology. China's primary export markets are its Pacific Rim neighbors, including Hong Kong, Japan, the USSR, the United States, and Singapore. Agricultural imports come mostly from the United States, Canada, Australia, and New Zealand.

China's cultivated land dropped from 108 million hectares in 1952 to about 95 million in 1990 because use for other purposes exceeded reclamation efforts. Meanwhile, the population rose from 574 million to 1.1 billion. On a per capita basis, this meant that cultivated land dropped by more than half, from 0.188 hectares in 1952 to 0.086 last year. By the year 2000, population is projected to exceed 1.3 billion and cultivated land is expected to drop to around 94 million hectares so that each citizen would be supported by only 0.074 hectares, roughly the size of two basketball courts. These trends will force China's farmers to exercise great skill in planting the most advantageous combination of crops. It is expected that the area sown to coarse grains will continue to decrease with more emphasis on expanding wheat, oilseeds, and sugar.

Macroeconomy

GNP and Inflation Fell in 1989

Tight fiscal and monetary policies begun in 1988 and intensified in 1989 induced a rapid decline in China's economic growth. China's 1989 real gross national product (GNP) expanded only 3.9 percent, significantly lower than the 11.2-percent recorded in 1988 (table 1). All sectors except agriculture experienced declining rates of growth (table 2). The economic retrenchment was successful, however, in reducing inflation. Responding to reduced fixed asset investment, flat credit disbursement, and increased savings rates, the 1989 general retail price level fell to 17.8 percent over 1988, compared with the 18.5-percent increase of 1988 over 1987. From March to December 1989, the rate of increase for retail prices declined monthly until by December it was only 6.4 percent over the same period in 1988.

The economic slowdown reduced rural enterprise growth by half. Survey data indicated that rural enterprise gross output value only grew 14.8 percent in 1989, compared with a 33.5-percent average annual growth rate between 1985 and 1988. Officials in China estimate that some 3 million enterprises were closed or merged during 1989. The decline added to China's constant unemployment difficulties and substantially decreased state tax revenues. The 1989 state budget deficit increased about 18 percent to more than 9.5 billion yuan, the largest since 1980.

Urban retail prices went up 16 percent over the previous year while rural ones increased 19 percent. For the country as a whole, the prices of foodstuffs rose 16 percent; grain, 21 percent; meat, poultry and eggs, 14 percent; fresh vegetables, 2 percent; and aquatic products, 16 percent. The cost of clothing went up by 18 percent; fuel, 27 percent; and agricultural inputs, 19 percent. This is in contrast to 1988 when foodstuffs rose 23 percent; grain, 14 percent; meat, poultry and eggs, 37 percent; fresh vegetables, 32 percent, and aquatic products, 31 percent.

Table 1--Yearend macroeconomic indicators

	1988	1989
Population	1.096	1.119
GNP growth (%)	11.2	3.9
Money supply		
M1	548.7	583.4
M2	960.2	1139.3
Domestic credit	1156.0	1353.4
Savings deposits	742.6	852.6
State revenues	258.8	291.9
State expenditures	266.8	301.5
Deficit	8.1	9.5
Fixed asset investment	449.7	400.0

Sources: 1989 Statistical Yearbook; 1988 and 1989 Economic Communiques; various FBIS reports; and IMF statistics.

Table 2--Value of industrial and agricultural output 1/

(billion yuan)	1988	% change from '87	1989	% change from '88
Total industry	1,822	20.8	2,188	8.3
State sector	1,035	12.6	--	3.7
Collective sector	659	28.2	--	10.7
Private sector	79	47.3	--	24.1
Heavy industry	925	19.4	1,118	8.2
Light industry	898	22.1	1,070	8.4
Total agriculture	587	3.2	655	3.3
Crops	328	-0.5	--	2.1
Forestry	28	3.8	--	0.9
Animal husbandry	160	10.5	--	5.5
Sideline products	39	10.4	--	5.8
Aquatic	32	11.8	--	8.0

1/ Output value calculated according to current prices and growth rates according to comparable prices. The average 1989 exchange rate was 3.7651 yuan/dollar.

Sources: 1988-89 Economic Communiques; 1989 Stat. Yearbook.

Foreign Trade Situation Improves

Foreign trade continued to expand in 1989, reaching \$111.63 billion, an 8.6-percent increase over 1988. However, this was much less than the 23.9-percent rise in 1988. Nonetheless, the trade deficit declined 13.7 percent to less than \$6.7 billion (table 3). China's agricultural exports rose slightly in 1989, but continued their slow decline as a share of total trade to 18.5 percent. In contrast, agricultural exports climbed to \$6.7 billion, an increase in share of 0.8 percent. Wheat imports continued to be the largest single value component of China's imports, at \$2.6 billion, though the value of fertilizer imports increased to a close second of \$2.4 billion.

Modest 1990 GNP Growth

The official 1990 GNP growth rate target is 5 percent, with a 6-percent increase in gross value of industrial output (GVIO) and a 4-percent increase in gross value of agricultural output (GVAO). The central bank has also announced that 1990 money supply growth will be less than during 1989. Investment policy will be substantially altered to channel more

Table 3--China's foreign trade indicators, 1987-89

	1987	1988	1989
US \$ billion			
Exports: 1/			
Total	39.541	47.540	52.486
Agriculture	8.027	9.457	9.702
Share (%)	20.3	19.9	18.5
Imports:			
Total	43.393	55.251	59.142
Agriculture	3.888	5.828	6.705
Share (%)	9.0	10.5	11.3
Balance:			
Total	(3.852)	(7.710)	(6.656)
Agriculture	4.139	3.629	2.997
Foreign exchange reserves	15,236	17,548	17,022
Avg. exchange rate	3.722	3.722	3.765

1/ All trade data are on an f.o.b. calendar year basis.

2/ Numbers in parenthesis are negative.

Sources: General Administration of Customs, China's Customs Statistics, various issues; International Monetary Fund, International Financial Statistics, May 1990, p. 166.

funds into agriculture and certain high-profile state industries (particularly energy and transportation). China's officials forecast a 1990 unemployment rate of between 4 and 5 percent as opposed to only 2 percent in 1988 and 2.3 percent in 1989. However, many Western economists believe the unemployment figures are grossly understated and that the true 1990 rate could be as high as 15 percent.

Despite the government's growth targets, China's economy continued to hover on the brink of recession during the first quarter of 1990. From January through April, China's industrial output value only grew 0.5 percent over the same period in 1989. In response to faltering industrial output and unforeseen demands on the banking sector stemming from a record grain harvest, credit restrictions were relaxed somewhat during the last quarter of 1989. However, much of the money injected into the system likely only ended up maintaining production capacity.

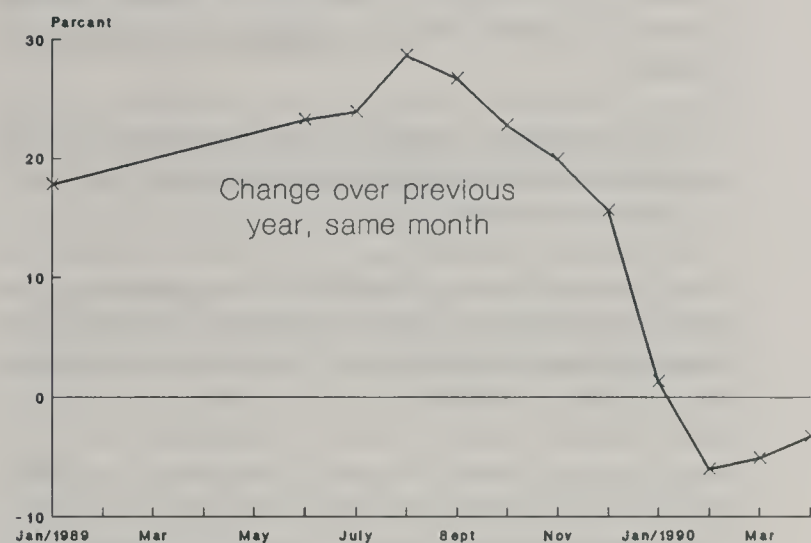
Although production has been buoyed, flat or declining consumption levels have meant steady increases in producer and retail stocks rather than increases in retail sales and reductions in enterprise debt.

The inflation rate fell throughout 1989 in response to severe monetary and fiscal restrictions. The outlook for 1990, however, is unclear. If monetary restrictions continue to relax, there may be a renewed bout of inflationary pressures. It seems more likely, however, that continued fear of inflation will move policymakers to err more on the side of caution and maintain a relatively tight grip on fiscal and monetary policies despite increasing concern and scattered indications of an approaching recession. The one caveat to this would be if the reductions in aggregate demand and other economic imbalances caused 1990 unemployment rates to rise dramatically. Although rural unemployed workers could be absorbed back into the farm labor force, increased urban unemployment could give rise to unrest and be even less acceptable to the leadership than continued inflation (fig. 1).

As 1989 closed, reduced consumption created large supplies of consumer goods at retail and marketing institutions as well as stockpiles at factory sites and warehouses. Reacting to tight credit, many enterprises and some banks refused to pay their debts or delayed payment for an extended time. Additional sums were tied up in stocks as consumer confidence dropped and retail sales slumped. The credit infusions, though likely to have a positive impact on industrial output, did not improve consumer spending activity or resolve the growing inter-enterprise debt problem.

More recently, as central government leaders have begun to speak out against economic stagnation, attention has been given to addressing consumption and production problems. One result was the March 1990 reduction in the People's Bank of China's central commercial loan rate by 1.26 per-

Figure 1
Value of Total Monthly Retail Sales



Source: China Statistica Monthly
• Feb-May 1989 percentages are estimates

centage points to an average annual rate of 10.08 percent. However, China's press reports predict that output growth is not likely to show much improvement until the second half of 1990. On the other side of the equation, the government may attempt to reduce the surging savings rate in order to increase individual consumption.

Although 1990 industrial growth is likely to be little improved over 1989, the outlook for agriculture is much brighter. The state has heightened administrative pressures toward development, increased central support for agricultural capital construction investment 200 million yuan to 18.2 billion in 1990, and worked to ensure adequate supplies of farm inputs and the dissemination of new technologies and improved seeds.

With slow growth and financial austerity, imports will likely grow less than exports. The trade balance will be increasingly important as China moves into its peak debt repayment period in the early 1990's (table 4). The current economic difficulties will, at least in the short-run, likely not present problems for repayment. By the end of 1989, growth in foreign debt had slowed and reduced imports brought a needed increase in foreign exchange reserves.

Extremely low growth during the first half of 1990 will likely keep China's 1990 GNP increase modest, with only a slight possibility of improving on 1989's 3.9 percent. Increases in agricultural output will mean higher growth in GVAO, though well within the 3 to 4.7 percent range of the last 5 years. GVIO growth in 1990 will probably remain significantly lower than the 17 and 21 percent in 1987 and 1988. It is uncertain whether it will hit the target of 6 percent or fall to only 4 to 5 percent after the dismal 1.4-percent growth during the first 5 months of 1990.

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Agricultural Trade

Grain Exports Decline in 1989

With the continued development of rural enterprise exports, China's calendar 1989 agricultural exports, measured as a share of total exports, fell 1.4 percent to 18.5 percent or \$9.7 billion of \$52.5 billion. Agricultural imports increased in share to 11.3 percent or \$6.7 billion of \$59.1 billion in total imports (table 3).

The most important exports were grains, particularly corn and soybeans, tea, canned food, raw silk, cotton, and cotton

yarn. However, only sugar and raw silk volume and value showed major increases, while cotton and cotton yarn dropped significantly from 1988 levels because of a poor harvest and steadily increasing domestic demand. Grains accounted for the largest share of agricultural export value, more than 12.3 percent (appendix table 5).

The composition of agricultural imports changed substantially from 1988 as the volume of sugar plummeted 57 percent to 1.58 million tons and cotton rose more than 1,300 percent to 520,000 tons. The value of wheat imports also rose substantially from \$1.7 billion to nearly \$2.6 billion, though this was due to an increase in price rather than volume (appendix tables 4 and 5). In fact, the wheat imports only increased from 14.55 to 14.88 million tons in 1989 because of the bumper grain harvest. Corn continued its dramatic slide from the 1987 record of over 1.5 million tons imported to only 70,000 in 1989.

Calendar 1989 U.S. agricultural exports to China climbed 88.8 percent to more than \$1.4 billion (appendix table 8) from increased sales of wheat, cotton, and corn, and higher wheat prices. In 1989, these three crops accounted for 97.6 percent of the total value of U.S. exports to China. Wheat exports rose 12.1 percent to more than 7.39 million tons while the value rose 58.7 percent to more than \$1.107 billion. U.S. cotton rose from 20,154 tons to 195,999 tons, with an increase in value of 89 percent to \$258.8 million. U.S. corn exports jumped to 302,269 tons and a value of \$33.5 million after no exports in 1988. (The U.S. volume number is considerably higher than China's official corn import number of 70,000 tons because over 200,000 tons were shipped in December and not counted until received at a port in China for 1990 imports).

In 1988, the majority of U.S. wheat sales to China were under the Export Enhancement Program (EEP). In contrast, for 1989 only 3.41 million of 7.69 million tons fell under EEP. As of June 19, 1990, China had 3 million tons of U.S. wheat offered, with 2.454 million tons in sales at an average bonus of \$10.28 per metric ton. In marketing year (June 1-

Table 4--China's foreign debt and debt repayment schedule, 1985-1992

(\$ billions)	1985	1986	1987	1988	1989	1990	1991	1992
China's total debt	16.7	23.7	35.4	42.0	--	--	--	--
Medium- & long-term	10.0	16.6	26.0	32.2	--	--	--	--
Short-term	6.4	6.1	8.2	8.8	--	--	--	--
Medium- & long-term debt repayment value	2.5	3.3	3.8	4.4	4.4	5.6	5.7	5.9
Principal	1.3	2.3	2.0	2.2	2.1	3.4	3.6	4.1
Interest	1.2	1.1	1.8	2.2	2.3	2.2	2.0	1.8
Debt service ratio	6.3	8.2	7.5	9.0	--	--	--	--

Source: Japan External Trade Organization's (JETRO) China Newsletter, No. 85, March-April 1990, p. 7.

May 31) 1989/90, sales fell from 1988's 6.35 million to only 2.9 million tons. For the last 3 years, the average bonus declined from \$37.92 in 1987/88 to only \$11.19 per ton in 1989/90 (table 5).

China's Agricultural Exports Likely to Increase in 1990

Exports are expected to continue to increase in 1990. First-quarter value shows a 13.4-percent increase over the same period in 1989 to \$8.95 billion. However, data also indicate that the volume and value of canned food, cotton and cotton yarn, silk, and cloth exports declined, generally because of domestic shortages or credit austerity related to export company purchasing difficulties.

First-quarter 1990 import levels fell 20 percent in value to only \$7.32 billion. The decline is attributed to the 21.2-percent devaluation of the yuan in December 1989, a sluggish economy, and most importantly, increased government restrictions on luxury good imports. China's trade officials are forecasting higher import levels in the latter half of 1990, noting that foreign exchange holdings are up and that there are second quarter due dates on some import contracts and recent agreements on relatively large quantities of grain.

Increased government investment in agricultural production in 1990 and a relatively successful harvest may further decrease China's agricultural imports. For example, another bumper harvest may allow reduced wheat imports, though a dramatic decline is unlikely. Tighter foreign exchange supplies caused by peak debt repayments in 1991-92 will also push the government to reduce imports. These two pressures to reduce grain imports, however, will be constrained by continued increases in urban resident demand for fine grain, particularly wheat.

Table 5--U.S. EEP wheat initiatives, sales and bonuses for China, 1987-90*

Cal. yr	Initiatives	Sales	Avg. bonus
	(metric tons)		(\$/mt)
1987	4,000,000	3,700,000	38.89
1988	7,200,000	6,490,000	24.37
1989	3,000,000	3,410,000	17.73
1990*	3,000,000	2,453,775	10.28
Mktg. year 1/			
1986/87	1,000,000	1,000,000	34.25
1987/88	6,200,000	4,940,000	37.92
1988/89	6,000,000	6,350,000	19.20
1989/90	4,000,000	3,304,500	11.19

* 1990 sales are as of June 19, 1990.

1/ June 1 through May 31 marketing year.

Source: USDA, Foreign Agriculture Service press releases.

China's Agriculture: The Foreign Connections

Foreign Aid and Investment

Since the economic reform program was initiated in the late 1970's, foreign technical, educational, and financial assistance for China's agricultural development increased rapidly. Since 1980, China has received, primarily from the World Bank, over \$2 billion in investment for agricultural development projects. Key projects include increasing grain production on the North China Plain, developing new farmland on the Sanjiang Plain (Northeast China), red soil renovation in Jiangxi and Fujian provinces, and the national development of adequate supplies of milk and dairy products in urban centers.

China's Ministry of Finance (MOF), the Bank of China (BOC), and the Ministry of Foreign Economic Relations and Trade (MOFERT) guarantee loans from the three largest lending agencies involved in China, the World Bank, the Asian Development Bank (ADB), and the Overseas Economic Cooperation Fund (OECF). Unless specifically targeted towards the Agricultural Bank of China for special purpose loans or for institutional development, loan disbursement is generally managed by provincial governments or province-level agencies or commissions (e.g., the province-level state educational commission would handle an education loan).

Educational and technical assistance programs have also played a key role in China's agricultural development. During the 1980's, China sent over 2,000 teachers and students to foreign universities for agricultural training, received over \$120 million in World Bank and Ford Foundation funds for agricultural university teacher training and materials, established formal exchange programs between 19 of China's agricultural universities and 89 foreign institutions, signed cooperative agricultural exchange agreements with 19 countries, and received United Nations' Development Programme (UNDP) aid and loans for improving agricultural universities.

In fact, between 1986 and 1990, China was the largest recipient of UNDP aid with \$165 million (in services rather than cash) allocated, of which 20 percent went towards agriculture and forestry. The United Nations' World Food Program (WFP), the European Community (EC), the Asian Development Bank (ADB), the Overseas Economic Cooperation Fund (OECF), and some 30 foreign nongovernment organizations have also provided agricultural loans, aid or educational and technical assistance.

China's Ministry of Agriculture hopes to increase the flow of overseas investment funds. Key projects that they want funded include land reclamation, soil fertility improvement, shoal development and fish farming, water conservation,

Proposed World Bank loans

Forestry Sector I, \$150 million: Forestry sector development in 12 provinces.

Guangdong Agricultural Development, \$160 million: Development of Guangdong's marine fishing industry, coastal maritime aquaculture and export fruit and livestock sectors.

Hebei Agricultural Development, \$150 million: Improve and diversify Hebei's agriculture sector, including development of irrigation, aquaculture, agro-processing industry and agricultural marketing infrastructure.

Henan Agricultural Development, \$110 million: Develop 380,000 hectares of irrigated area in Yellow River Basin area and promote Henan livestock, aquaculture and agricultural processing industry sectors.

Irrigated Agriculture Intensification, \$300 million: Develop irrigation and crop diversification in the North China Plain area, including Jiangsu, Shandong and Anhui.

Mid-Yangtze Agricultural Development, \$64 million: Develop fruit farming in Sichuan and Hubei.

Rural Credit IV, \$160 million: Continue commercialization process within the Agricultural Bank of China.

Tarim Basin Irrigation, \$150 million: Upgrade 120,000 hectares of oasis irrigation and reclaim an additional 120,000 hectares of desert wasteland for cotton, wheat, fodder, vegetable, oilseed and timber production.

Yellow River Conservancy, \$350 million: Construct Yellow River dam to expand flood prevention, irrigation and hydropower.

Proposed Asian Development Bank loans

Agricultural Bank of China, \$50 million: Fund bank loans to finance the import of equipment and materials for modernizing agricultural industries.

Jilin Fertilizer, \$200 million: Construction of a nitrophosphate and urea plant.

Proposed Overseas Economic Cooperation Fund (Japan) loans

Guangxi Fertilizer Plant: Construct a 240,000-ton per year plant.

Guizhou Fertilizer Plant: Construct an 800,000-ton per year plant.

Inner Mongolia Fertilizer Plant: Construct a 520,000-ton per year plant.

Jiangxi Fertilizer Plant: Construct a 520,000-ton per year plant.

Weihe Fertilizer Plant, \$166 million: Construct a 520,000-ton per year urea plant in Shaanxi.

Yunnan Fertilizer Plant: Construct a 400,000-ton per year plant.

Source: The U.S.-China Business Council, Washington, D.C.

agricultural extension, and rural education. Specifically, the UNDP plans to allocate approximately \$165 million for 1991-95 and increase the share of aid to agriculture. Priority projects include increasing agricultural yields through better seed varieties and improved fertilizers, pesticides, and plant protection.

China's prospects for substantial foreign aid have receded dramatically. Although the June 4, 1989, crackdown had little immediate impact on agricultural production, the ramifications for its long-term development continue to mount. For example, most proposed World Bank, Asian Development Bank, and Overseas Economic Cooperation Fund (Japan) loans have been delayed (box). Although agriculture loans are technically considered humanitarian and not subject to the loan embargo, the entire approval process for China has slowed. Loans for the development of the fertilizer industry, however, are not humanitarian and have been embargoed.

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Inputs

In 1989, farm supplies of manufactured inputs, such as electricity, chemical fertilizer, and small tractors, increased. Supplies of plastic sheeting used by farmers to increase soil temperatures, reduce moisture loss, and prevent weeds, increased substantially. Yearend stocks of large and medium sized tractors decreased slightly (table 6).

Input Supply System Unchanged for 1990

Rural reforms initiated in the mid-1980's fostered the development of a two-tier price system—an open market and one government controlled to deliver input supplies. The government managed Supply and Marketing Cooperative (SM Co-ops) promised to sell fixed quantities of inputs, such as diesel fuel and fertilizers, at low, fixed prices to those farmers who had signed sales contracts to deliver grain, cotton, and oilseeds to government purchase stations. Corrupt cadres in the SM Co-ops earned quick profits by removing low-priced products from the state system and selling them in the open markets. Rising costs of these inputs cut farmers' profit margins and peasant opposition prompted the Government to terminate the two-tier price system.

In early 1989, officials ended open input supply markets and channeled all products through the government controlled SM Co-op system. In 1990, this monopoly supply system of about 28,000 SM Co-ops will serve some 56,000 townships

(towns). In addition, some 700,000 SM Co-op branch stores service 740,000 villages.

Special schools train about 8,000 SM Co-op personnel each year, but officials need to train tens of thousands of new teachers to teach new skills to the more than 4 million SM Co-op staff. Government officials are trying to improve the efficiency of these cooperatives and branch stores. The United Nations Development Program (UNDP) and the International Labor Organization (ILO) are cooperating with Commerce Ministry officials in Beijing to organize a school which will prepare instructors to teach SM Co-op personnel modern management and accounting methods. The school is scheduled to be opened in 1991.

Pricing continues to be a major problem in the monopoly supply system. Prices of inputs, largely manufactured in urban areas, have been allowed to rise as labor and material costs increase. For example, the price of chemical fertilizer, plastic sheeting, and pesticides rose 18.9 percent in 1989. Government purchase prices for farm products, however, have risen more slowly because policy has kept urban retail prices for grain stable. If the Government increases its grain purchase price, it must allocate more funds from tax revenues to subsidize the difference between purchase and retail prices. Given budget limitations and its policy of favoring urban consumers, the Government has restricted farm procurement price increases. Farmers are caught between these two sets of administered prices, and their profit margins in the last few years have decreased.

Table 6--China's major manufactured farm inputs, 1985-89

Item	Unit	1985	1986	1987	1988	1989
Yearend stocks:						
Large-medium tractors	1,000 no.	852	866	881	870	860
Hand tractors	"	3,824	4,526	5,300	5,958	6,530
Rural trucks	"	430	499	550	591	620
Machinery production:						
Large-medium tractors	1,000 no.	45	34	40	52	42
Hand tractors	"	823	773	1,106	1,316	430
Rural electric consumption 1/	Mil. kwh	55,470	57,800	65,900	65,500	78,800
Fertilizer output 2/:	1,000 tons	13,222	13,957	16,722	17,402	18,550
Nitrogen	"	11,438	11,592	13,423	13,656	NA
Phosphate	"	1,760	2,340	3,259	3,692	NA
Potassium	"	(24)	(25)	(40)	(54)	NA
Fertilizer applied 2/	1,000 tons	7,7601	9,520	20,100	21,420	23,730
Chemical pesticides	"	211	203	260	194	224
Plastic sheeting	"	--	--	287	337	420

1/ Not all for agricultural production. 2/ All figures in effective nutrient weight. 3/ Numbers in parenthesis are derived.

Source: Various annual SSB Communiques; China Statistical Yearbook, 1989, p. 300; A Statistical Survey of China, 1989.

Outlook for Supply of Manufactured Inputs in 1990

Chemical fertilizer supplies during 1990 are scheduled to increase by 2.4 percent to 87 million tons (product weight basis). Domestically produced fertilizer will expand from new plants in Shanxi, Henan, and Qinghai provinces. But demand will still exceed supplies and Government officials intend to allocate foreign exchange for imports to fill the gap (table 6).

New investments will provide farmers with a better balance of fertilizers. Currently, nitrogen accounts for about 77 percent of total output. About 64 percent of the chemical fertilizer plants produce it, 35 percent make phosphorous, and 1 percent for potassium. Soils in many regions of China are short of phosphorous and potassium. Six, large plants will be constructed to produce nitrogen and phosphorus fertilizers in Sichuan, Liaoning, Shaanxi, Jilin and the Inner Mongolia Autonomous Region. A plant to produce potassium is under construction in Qinghai province.

Pesticide output in 1990 is scheduled to increase 5 percent to 210,000 tons. Efforts will be made to manufacture less toxic but more effective products. Gaps between domestic demand and supply will continue to be made up through imports.

In 1990, the plastic sheeting production target is 500,000 tons, up 19 percent from 1989. A decade ago the product was practically unknown in China's rural areas, but in 1989 it was applied to more than 2.5 million hectares. In 1989, 3,800 relatively large plants in urban areas and 27,000 smaller rural plants produced 420,000 tons of plastic sheeting. In addition, the plastics industry supplied farmer's with pipe for irrigation, bags for fertilizers, and packaging for crop products.

The number of tractors serving farms in 1989 increased 8 percent from 1988 to 7.4 million, and the combined power of agricultural machinery increased 3.6 percent to 274.6 million kilowatts. The number of large and medium tractors decreased but the number of small (15 horsepower) ones increased. About half of China's cultivated land is plowed by tractors. Nearly half of all tractors also haul goods and passengers in rural areas. In 1989, the rural truck inventory increased by 29,000 to a total of 620,000 which should reduce the use of tractors for transportation.

Many of the tractors are 30 to 40 years old and soon will have to be replaced. Tractor sales in early 1990, however, were sluggish for many reasons. Tight policies denied farmers credit, demand for tractors for transportation decreased because of reduced rural economic growth, diesel fuel prices soared, and the tax burden plus rising input costs squeezed profit margins so that farmers were reluctant to buy new equipment. Also, farmers are nervous that rural policies might change and require that newly purchased tractors be deeded to economic cooperatives.

China's farm mechanization program for the 1990's is scheduled to be completed soon by the Ministry of Agriculture. Top priority will be given to mechanizing the production of rice, corn, and wheat.

For 1990, rural electrical supplies will increase from new generating facilities. But the price of electricity will rise 30 to 100 percent, increasing the cost of irrigation and constraining rural industrial growth.

Upsurge in Water Conservation Projects

During the commune period (1959-83), farmers were mobilized to reclaim land, build irrigation and drainage facilities, and construct rural roads. Then work on these projects waned. But in the last two winter seasons (1988/89 and 1989/90) there was an upsurge in construction activity. In 1989/90, 4.58 billion yuan were invested in water conservancy projects of which the central government contributed 12 percent; provincial, county, and township governments 44 percent; and peasants the remaining 44 percent.

In 1989/90, hundreds of millions of rural citizens contributed 3.2 billion work days and moved over 4.2 billion cubic meters of earth and stone. Government officials claim that irrigation and drainage service improved for 3.5 million hectares. Drinking water systems were installed to service 6 million farmers.

1990: The "Year of Scientific Farming"

With limited arable land, farmers must improve per unit yields and become more efficient to raise living standards. In 1990, government officials initiated programs which emphasized the application of science and technology to assist farmers in using natural resources more efficiently, raise output, and improve product quality and farm profitability.

The State Science and Technology Commission initiated the “spark plan” to popularize science and technology in rural areas. The term was borrowed from an article written by Mao Zedong entitled “A Single Spark Can Start a Prairie Fire.” The plan was to mobilize all fields of science to improve production, processing, storage, and transportation of products. For example, the Guangxi Ramie Products Group drew technical skills from the Guangxi Silk Spinning Research Institute, the Guangxi Agricultural Science Institute, and local production bases. Ramie (a natural bast fiber, *Boehmeria nivea*) output expanded, the quality of spinning, printing, and garment processing improved, which made the product more competitive in international markets. Officials claimed better profits for both producers and processors.

Rural schools have had two aims: reduce illiteracy, and prepare students for higher education. While young students did learn to read and write, much was not transferable to agriculture. In 1988, the State Education Commission initiated a “spark” program to train talented young people for rural employment and to teach adults in vocational education programs to boost output and profits. There are 33,000 township and 180,000 village technical schools. Curriculums in rural primary and secondary schools are being reformed to provide more practical courses and schools are being encouraged to offer special courses which will boost the output of local specialty crops and livestock. In 1990, additional resources will be allocated to improve the technical capabilities of rural administrators and farmers.

In 1989, the number of state agricultural service centers increased by 20,000 to a total of 65,000. In 1990, an additional 5,000 centers will be developed and the number of full-time extension personnel will be increased by 20,000.

About 20 percent of China’s farmland is covered by “agricultural technical contracts.” Technicians in service centers or other offices provide expertise for a specified fee. They tell farmers when to apply fertilizers and pesticides, and when to plant, irrigate, and harvest crops.

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Agricultural Production

Grain

Record Production in 1989

Production of wheat, rice, coarse grains, soybeans, potatoes, and pulses totaled 407 million tons in 1989, up 3.4 percent from 1988. Generally good weather and increased inputs boosted yields by 1.1 percent. Area sown to these grain crops increased by 900,000 hectares to 112.2 million (appendix table 1). China’s press reports suggest that total grain output may reach 410 million tons.

Wheat production in 1989 reached a record 90.8 million tons. Area sown to wheat rose to 29.8 million hectares, an increase of 1 million hectares. Winter and spring wheat area each increased by about 500,000 hectares. Yields were a record 3.05 metric tons per hectare because of improved varieties, better field management, generally favorable weather, and more chemical fertilizer and irrigation.

Rice output in 1989 hit a record 180.1 million tons (paddy basis), up more than 6 percent from 1988. The sown area increased by about 800,000 hectares and yields rose by 4.5 percent over the rather poor 1988 crop. Favorable weather and expanded use of hybrid varieties, which now account for about 30 percent of total rice area, were the primary reasons for the increase in yields.

Coarse grain production (corn, sorghum, millet, barley, and oats) increased to 94.6 million tons, up 0.5 percent from 1988. Area sown to coarse grains increased to an estimated 28.5 million hectares (appendix table 1). Drought conditions in the North China Plain and the Northeast region did not reduce corn, sorghum, and millet yields as much as initially estimated in fall 1989. For example, 1989 corn yields are estimated at 3.88 tons per hectare, compared with 3.93 tons in 1988, a decrease of less than 2 percent.

Production Likely Up in 1990

Total sown area for 1990 is estimated to increase 200,000 hectares to 146.5 million hectares. Given Government lead-

ers heightened sensitivity to increase grain production in 1990, area sown to economic and other crops will fall and grains will expand by 1.5 million hectares to 113.3 million hectares. Purchase prices for some grains for 1990 are scheduled to rise (tables 7 and 8).

Since 1985, China has lost an average of 460,000 hectares of arable land each year. In 1990, workers will reclaim an estimated 200,000 hectares so that the net loss will be a little more than 200,000 hectares. Farmers will increase the intensity of land use so that the multiple crop index will climb a few percentage points (the ratio is computed by dividing total sown area by total cultivated area times 100). In 1990, cadres encouraged farmers to sow over wintering crops rather than let the land lie fallow. Usually some 13 million hectares are left fallow in southern provinces, but this year farmers planted grain, rapeseed, vegetables, and green manure crops on 2 million of these hectares. Also millions of farmers returned to the land as construction, commercial, and industry jobs in cities and towns ended because of the downturn in the economy. These farmers will provide extra labor in rural areas to put in more crops. (See the special article for a discussion of trends in sown area.)

Wheat output for 1990 is forecast to rise to a record 94 million tons. China's officials reported last autumn that fall sown grain area had increased by 600,000 over 1988, including 500,000 for winter wheat and 50,000 hectares for winter barley and pulses. If spring wheat area is about the same as last year, total wheat area should be around 30.3 million hectares. ERS analysts assume that yields will increase again in 1990 to 3.1 tons per hectare.

Rice production likely will rise because of expanded area. Farmers' planting intentions suggest a 1990 increase in rice area of 1.7 percent, with early rice up 1.5 percent. Ministry of Agriculture officials believe hybrid rice will expand to 14.7 million hectares. Last year, rice farmers had very good weather and record yields. More normal weather patterns this year may offset the expanded area. Nonetheless, a 180-million-ton crop is projected for 1990, about the same as in 1989.

Coarse grain outturn is expected to reach a record 96.4 million tons. Farmers plan to increase area sown to corn by 2.6 percent. Drought in the North China Plain and in the Northeast region reduced yields last year. Corn yields fell from 3.93 tons per hectare in 1988 to 3.88. More normal weather this year and good profit margins for raising corn likely will boost yields.

Table 7--1989 production and 1990 production targets

(million tons)	1989	1990	Percent change
Total grain	407.51	412.5	1.2
Cotton	3.79	4.4	12.1
Edible oilseeds	12.91	14.7	13.8
Sugar crops	57.93	66.7	15.1
Meat	23.28	25.5	9.5
Eggs	na	7.2	na
Milk	3.80	4.9	28.9
Wool	0.24	0.24	0.0

Source: FBIS, No. 17, 1990, p. 75.

Oilseeds

Oilseed Production Fell In 1989

Total oilseed production (peanuts, rapeseed, sesameseed, sunflowerseed, and other oilseeds) decreased 3 percent to 12.8 million tons. Area sown to oilseeds fell by 1 percent. Yields declined about 3 percent primarily because drought damaged peanuts in Shandong province and sunflowerseeds in the Northeast region (appendix table 2).

Oilseed production, according to the USDA definition includes, cottonseed, peanuts, rapeseed, and sunflowerseed, fell 7 percent to 28.45 million tons. Area sown to cottonseed and soybeans decreased and the drought reduced soybean yields in Shandong and Manchuria.

The domestic demand for oilseeds and products increased during the year because of population growth and rising per capita incomes. Demand for edible oil for direct human consumption and use in the rapidly expanding food processing industry is especially strong. Demand for oilseed meal is also strong because of the increased production of compound feed—30 million tons in 1989, up from 25 million in 1987. Rapeseed, cottonseed, and soybean meal are prime sources of protein in compound feeds.

Oilseed exports (primarily peanuts and soybeans) declined in 1988/89 because of a drop in production and because policymakers kept more at home to meet growing domestic requirements. For 1988/89, oilseed meal exports (mostly cottonseed, rapeseed, and soybean meal) were estimated at approximately 3.0 million tons. To satisfy growing urban demand, trading companies imported a record 1.3 million tons (primarily palm, rapeseed, and soybean) of edible oils.

Oilseed Outturn Expected to Rise in 1990

A combination of administrative measures and procurement price increases for oilseeds likely will boost area sown by 2 to 3 percent (table 9). More normal weather plus price and nonprice incentives likely will boost yields so that output could expand to about 11 million tons in 1990, up substantially from 10.5 million in 1989.

Soybean area for 1990 likely will match 1989, around 8 million hectares. Government purchase stations have announced that the procurement price for soybean oil and meal will rise 30 percent this year (see table 9). Only farmers in the Northeast region will expand soybean area. The current price and cost structure is such that even with the price increase, farmers in some areas can earn more money per hectare by raising corn. With the return of more normal weather in 1990, yields and output likely will rise.

Cottonseed outturn for 1990 likely will be 7.6 million tons, up substantially from 6.4 million tons in 1989. Area sown to cotton likely will increase to an estimated 5.5 million hectares and yields are expected to rise because of the 30-percent higher procurement price for cottonseed oil.

Peanut area likely will expand 3.3 percent in 1990, according to China's press. With more normal weather, yields

could reach from 1.9 to 2.0 tons per hectare, with output expected to be around 5.8 million tons, well above the last couple of years.

Rapeseed area expanded 5 percent for 1990 and output could rise 10 percent. Especially important was the increase in winter sown rapeseed in the lower Yangzi River Valley. Rural cadres vigorously pushed farmers to plant rapeseed rather than let their land lie fallow over the winter.

Sunflower area is scheduled to increase by nearly 6 percent. More normal weather in 1990 should boost yields to an estimated 1.4 tons per hectare, compared with 1.3 tons for 1989. But continued problems with disease will tend to constrain yield growth.

1990 Oilseed Exports Down

Oilseed exports for 1989/90 likely will decrease because of reduced production. Domestic demand for oilseeds will be balanced by the country's requirement to export to earn foreign exchange. If international demand for oilseeds is soft and prices fall, China will constrain exports.

Oilseed meal exports for 1989/90 are expected to fall because oilseed outturn fell in 1989 and domestic demand for meals has grown substantially with the expansion of the compound feed industry.

Table 8--Selected grain prices, 1989

(yuan/ton)	Avg. State retail price 1/ 1988	1989	Feb	Average May	free market price Aug	Oct	Nov	Dec
Rice	412	553	1,538	1,602	1,597	1,593	1,575	1,530
Wheat	326	373	937	976	984	998	1,019	1,009
Corn	240	265	671	741	742	750	747	736
Sorghum	212	212	567	593	618	663	661	656
Soybeans	695	695	1,618	1,680	1,668	1,671	1,651	1,610

1/ Data based on reporting from over 200 locations. Fixed prices were officially raised in September. The official Yuan/dollar exchange rate changed from 3.7128 to 4.72 on December 17, 1989.

Source: FAS/Beijing, Grain and Feed Annual Report, 1990, p. 4.

Table 9--Edible oilseed purchase and retail prices, 1989-90

(yuan/ton)	1989		1990		February 1990 free market
	Purchase	Retail	Purchase	Retail	
Peanut oil	3.68	2.83	4.62	3.55	6.49
Rapeseed oil	3.17	2.43	4.15	3.19	5.50
Soybean oil	3.34	3.34	4.30	4.30	5.21
Sesame oil	3.84	2.95	4.78	3.68	10.92
Cottonseed oil	2.91	2.43	3.80	3.17	5.23
Tea oil	3.77	2.90	4.70	3.62	na

Source: Ag Counselor, American Embassy Beijing, FAS/USDA, Washington, D.C., Report Number CH0027, April 2, 1990, 3 pp.

Government austerity programs also limited credit, making it difficult for purchase stations to buy enough oilseeds to process into meal and oil. Furthermore, China's foreign trade corporations are finding that it is not as profitable to export soybeans and soymeal as in previous years. For example, government purchase stations in Heilongjiang province, the primary soybean exporter, bought soybeans from farmers at negotiated prices of about \$300 per ton, well above the international price of just over \$200.

Edible vegetable oil imports are expected to remain high in 1989/90 because of population and income increases and decreased oilseed output last year. Imports, however, will be constrained by limited foreign exchange.

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Cotton

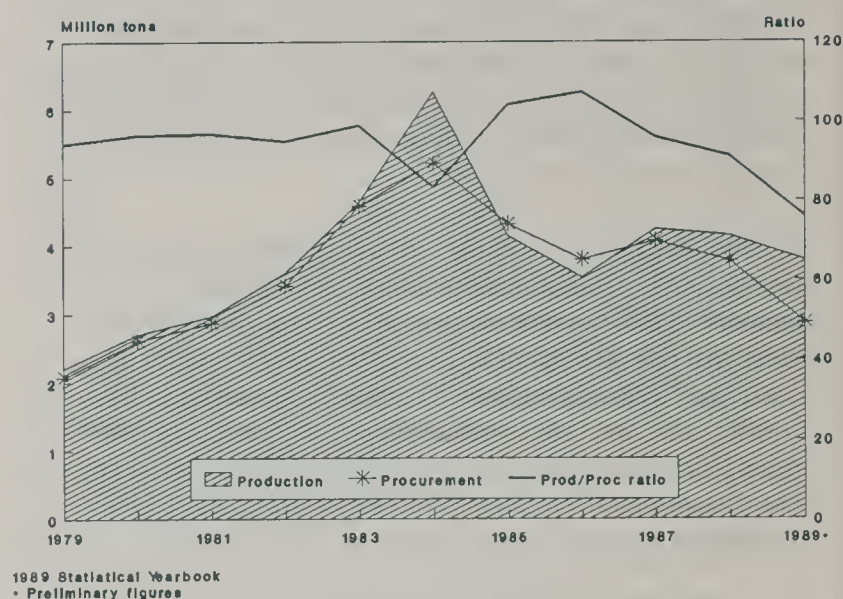
Cotton output fell 8.7 percent in 1989 to 3.79 million metric tons because of a 6-percent reduction in area sown to 5.2 million hectares, flooding in the southern growing areas, drought in the north, high input costs, and a low procurement price relative to grain. The 1989 cotton yield of approximately 728 kilograms per hectare was the lowest since 1982. However, the output number may be raised slightly because cotton procurement problems had a negative impact on accurate local reporting.

Industrial demand for cotton remained high despite the closing of an estimated 1 million rural enterprises, some of which were small textile mills, and the general economic slowdown brought on by the financial and monetary austerity program. Cotton yarn production increased 1.8 percent over 1988 to just above 4.7 million tons.

Procurement Problems Exacerbate Shortage

Throughout the 1989 procurement period, central and provincial officials repeatedly called on peasants to sell their cotton to the State. However, 1990 crop price increases (table 10) announced early in the 1989 marketing year, anger over the extensive use of IOU's during the 1988/89 procurement year, low returns relative to other crops, and increasingly high production costs prompted many peasants to retain the crop for sale this year. Accordingly, procurements slowed dramatically through the fall and winter of 1989/90. Preliminary figures indicate calendar 1989 cotton procurement fell to 2.88 million tons, only 75.9 percent of production (though 89/90 September/August procurement year data will likely be less severely affected). This contrasts with calendar 1987 and 1988 procurement of 95.9 and 91.1 percent, respectively (fig. 2).

Figure 2
Cotton Production and State Procurement



Procurement problems also contributed to the State Statistical Bureau's surprisingly low 1989 cotton production number. Local officials may have hedged against the procurement difficulties by putting in slightly lower production numbers, thereby reducing pressures for increased local procurement. If this did occur, it will likely become evident in higher 1990 production and procurement numbers than would otherwise be anticipated as some portion of this year's harvest is rolled over into next year's reports.

Stocks Decline, Imports Increase

Although China's cotton stocks remain a State secret, available data suggest the stock-to-use ratio fell in 1989. Several years of relatively poor harvests and textile industry demand likely involved drawing down State cotton stocks during 1989, possibly to the lowest level since the early 1980's when stocks are estimated to have been less than 1 million tons.

China's total calendar 1989 cotton exports fell 42 percent to just over 272,000 tons and imports ballooned 1,104 percent to 519,000 tons. U.S. cotton exports to China experienced a major increase, from 21,154 metric tons in 1988 to 195,999 metric tons in 1989.

However, foreign exchange pressures, self-sufficiency considerations, and market changes continue to pressure China's textile producers to increase their use of man-made fibers. A press report indicated that 70 percent of the fibers used by the textile industry are natural (probably cotton, wool, jute, hemp, and ramie, and includes clothing and industrial textile production). The report also points out that the share of natu-

ral fiber use will likely decline to around 67 percent by 1995, though the amount required will increase to 5.4 million tons.

China hopes to increase annual domestic production of chemical fiber from its current 1.45 million tons to at least 2.5 million tons by 1995. To support this growth, 82 percent of 1989 state investment for the textile industry went towards increasing chemical fiber production capacity, and 80 percent is expected this year.

Cotton Production Increase Likely in 1990

China's official 1990 targets call for increasing cotton production to between 4.25 and 4.4 million tons by raising sown area 7 percent to around 5.6 million hectares. If the area target can be met, and assuming favorable weather, China could meet its 1990 production target.

Cotton Price and Incentive Increases

To ensure more cotton area, last autumn the state announced a 1990 price increase to about 300 yuan per 50 kgs of stan-

dard ginned cotton (table 10), prompting some farmers to store their cotton until this year to obtain the higher price. Although the 1990 price increase was announced early enough to affect late-planted cotton, it apparently did not come in time for northern farmers to leave space in the winter wheat for cotton intercropping.

A great deal of effort has also been put into opening up wasteland areas to cotton production in Shandong, Hebei, and Xinjiang by offering attractive land contracts, subsidizing the reclamation, and offering limited tax holidays. The poor harvests over the last several years moved the central government to increase administrative pressures on local officials to ensure more area for the 1990 crop. A press report from China called on farmers to plant more fallow land to cotton, to increase cotton interplanting, to expand southern summer cotton planting area, and even to grow cotton on the tiny plots adjacent to their homes.

In addition to the price increase and administrative pressure to increase area, the government also authorized additional

Table 10--State procurement prices for standard grade cotton, 1983-90 1/

Year	Region	Price setting		Price	Avg price	Centrally mandated non-cash incentives (some provinces have add'l incentives)
		quota	bonus			
		(percent)		(yuan/50 kg)		(for each .5 kg procured over-quota)
1983 2/	South North	Base method	Base method	168.45 187.86	182.27	1 kg grain
1984 3/	South North	60 20	40 80	163.30 180.79	174.92	.75 kg grain
1985 4/	South North	60 30	40 70	163.30 176.42	171.03	None
1986	South North	60 40	40 60	163.30 172.04	na	None
						(for each 50 kg of cotton procured)
1987 5/	Unified	30	70	176.42	--	35 kg low-priced fertilizer; diesel oil; cash advance
1988	Unified	30	70	176.42	--	35 kg low-priced fertilizer; diesel oil; cash advance
1989 6/	Unified	--	--	236.42	--	35 kg low-priced fertilizer; 2.5 kg diesel oil; cash advance
1990 7/	Unified	--	--	300.00	--	Low-priced fertilizer; diesel oil; cash advance

na = not available -- = not applicable

- /1 Standard grade cotton is defined as grade 3 (of a range of 5) at 27 millimeters (of a range between 33 and 23 millimeters).
- /2 The 1983 procurement price was based on paying extra for cotton produced above a base amount. Note that the demarcation between North and South was the Huai River.
- /3 The 1984 procurement price was based on a proportional quota and over-quota system.
- /4 In 1985 the entire quota system was replaced with the contract procurement system.
- /5 By 1987 the North/South price difference was replaced with a single national procurement price.
- /6 In 1988 the quota/bonus procurement price was replaced with a single price. In addition, cotton procurement was recentralized, prohibiting all private cotton marketing.
- /7 The 1990 price has been quoted in various sources as both 296 yuan and 300 yuan, though most recent references use the latter. Although it is not certain that 300 yuan is the correct figure, we have chosen to use it here because of the preponderance of its use in the press.

provincial cash and noncash incentives. Henan province, for instance, announced a subsidy of 6.4 yuan per 50 kgs of cotton sold, 7.5 kgs of pesticide available per hectare planted to cotton, and an additional 1.5 kgs of diesel fuel per 50 kgs of cotton sold. All this would be in addition to the standard central government noncash incentives (see cotton price box). Other major cotton-producing provinces that have announced incentive increases are Hebei, Hubei, Shandong, and Jiangsu.

With the new procurement price, per hectare cotton income will be relatively close to grain, particularly in those provinces (Hunan and Hubei) that had successful 1989 grain harvests and have seen a decline in grain prices. Early 1990 corn prices fell significantly from the high levels posted after the 1989 crop failure and should make cotton more attractive to farmers in those provinces where corn and cotton compete for available area (particularly Shandong, Henan and Jiangsu). However, it is not clear that cotton can compete with other cash crops. For instance, except in those provinces where surging tobacco production and inadequate procurement funds have reduced prices, income from cotton would still lag behind tobacco.

Other Crops

Sugar Crop Production Declines

State Statistical Bureau figures show sugar crop production fell 6 percent in 1989 to 58 million tons (table 11). Weather in the northeast during the 1988 planting period was almost too wet for any crop except beets, prompting an explosion in beet sown area. In 1989, the majority of the decline in beet sown area was due to the return to normal weather at planting in the northeast.

Table 11--China's other agricultural product output

(1000 tons)	1986	1987	1988	1989
Sugar crops	58,525	55,504	61,875	57,930
Sugarcane	50,219	47,363	49,064	48,570
Sugarbeets	8,305	8,140	12,810	9,360
Sugar	5,250	5,060	4,550	4,960
Tobacco	1,707	1,943	2,734	1/ 2,785
Flue-cured	1,374	1,634	2,337	2,410
Tea	460	508	545	540
Jute and hemp	1,420	1,138	1,078	1,330
Silk cocoons	336	354	394	na
Aquatic products	8,235	9,550	10,061	na
Rubber	210	238	240	na
Fruit	13,477	16,679	16,661	18,370

1/ USDA estimate.

Source: China's Statistical Yearbook, 1989; and 1989 SSB Communique.

In 1989, beet production fell 3.6 million tons to only 9.24 million, while area fell almost 24 percent to only 569,000 hectares. Heilongjiang province, China's largest beet producer, saw 1989 area fall approximately 40 percent from the 426,680 hectares in 1988 and production fall over 28 percent from the 3.98 million tons harvested in 1988.

Southern sugarcane output in 1989 declined 1 percent to 48.8 million tons. Although 1989 area sown increased almost 4 percent to 959,000 hectares, poor weather conditions reduced yields.

For 1990, improved yields, better water management, hybrid seed, and the development of the sugar industry in certain target areas suggest generally improved cane, beet, and sugar output in 1990. The central government has raised the procurement price for the 1990 crop (140 to 145 yuan per ton for beet), the second rise in 2 years, and called for a production target of 66.7 million tons. The price increase, however, will likely have only a limited impact on the 1990 crop because farmers will still generally earn more growing grain or even some vegetable crops.

Information from Heilongjiang indicates that 1990 beet production is encountering some difficulties. Provincial officials announced a mandatory beet sown area target of 400,200 hectares. However, data suggest only 200,100 hectares, fully 20 percent less than in 1989, will be seeded. The decline resulted from the failure to exempt beet farmers from having to sell grain to the state, shifting area to other crops (primarily soybeans and wheat) because the income from beet production remains comparatively low, and fines or grain "donation" requirements imposed on beet producing households.

Although 1989 sugar output increased almost 8 percent to an estimated 4.96 million tons, it was still significantly lower than the 1986 record of 5.25 million tons. Because of higher sugar content in the 1989 crop, 1990 sugar production will likely see a minor increase despite the reduction in the 1989 sugar crop.

China's 500 sugar refineries have an annual capacity to produce some 6.8 million tons. However, a recent *China Daily* article reports that 1990 sugar production is not going well, with only 60 percent of available refinery capacity in use. Despite price increases, the prices paid to refineries are generally still below the actual costs of production.

The official government sugar production targets for 1991 and the end of the century are 6.9 million tons and 11.8 million tons. These targets, however, seem excessively ambitious given China's continued problems in acquiring modern, efficient refining capability and maintaining sugar crop area under increasing pressure from grain and other crops.

Sugar imports in 1989 fell a dramatic 57 percent to only 1.58 million tons. Reduced imports may have been the result of consumer hoarding of sugar after the record 3.7 million tons imported in 1988 and storage problems caused by higher production that year. High international sugar prices and China's increasingly limited foreign exchange reserves will likely limit short-term buying to government-to-government purchases. China may choose to draw down stocks if world sugar prices remain high. However, 1990 sugar imports should increase over 1989 levels if the northern beet harvest turns out as poorly as indicated. On the other hand, if the overall sugar crop harvest can be increased over 1989 levels, imports will likely match last year. If they do, steadily increasing consumer demand and reduced stocks will likely force China to reenter the international market prior to the 1991 harvest.

Record 1989 Tobacco Output

In 1989, tobacco production rose to an estimated record 2.8 million tons. Flue-cured increased 3 percent to just over 2.4 million tons because of a 200,000-hectare increase in sown area.

In 1989, the Tobacco Monopoly Bureau established special inspection teams to avoid procurement cadres incorrectly grading down the tobacco leaf to reduce the price paid to the farmer. However, certain areas experienced a series of difficulties, including improper grading, extensive use of IOU's, rapidly rising input prices, overflowing storage facilities, and greatly depressed prices. These problems prompted some peasants to destroy growing stands, which would have produced an estimated 40-50,000 tons of tobacco, in order to plant other crops. Nonetheless, 1989 tobacco procurement increased slightly over 1988 to reach approximately 2.05 million tons.

Tightened 1989 flue-cured tobacco grading standards reduced profitability. Although 1990 will see higher tobacco procurement prices, continued tight grading standards and increasingly competitive procurement prices for grain and cotton may pressure some farmers to reduce tobacco area. Furthermore, farmers who could not sell their 1989 tobacco could shift to other crops rather than risk selling 2 years of output in 1990.

However, local officials will likely continue to promote tobacco production despite some declining farmer enthusiasm and increased government pressures to grow grain. Extremely heavy taxes on cigarette sales have become an important component of local revenues. In addition, in those areas that did not experience procurement problems, farmers not yet growing tobacco will likely pressure local officials to allow them to shift into higher-income cash crops such as tobacco.

To support tobacco production, prices for the 1990 crop will be raised (table 12). Standard (zhonghuang grade 4) flue-cured tobacco will go from 90 to 105 yuan per 50 kilograms. Prices for all other grades except the highest will increase from between 10.5 and 14.2 percent. Regional price differentials will remain in place. The central government has also authorized substantial production subsidies. They are essentially investment allocations to the farmer for developing or improving tobacco crops and are not treated as income in tax calculations. For Yunnan province, the subsidy involves an additional 40 yuan per 50 kilograms for first-grade and 35 yuan for second-grade tobacco, while for the rest of the country the subsidy will be 30 yuan for first-grade and 25 yuan for second-grade tobacco.

A recent survey estimated that 1990 flue-cured tobacco sown area will be around 1.4 million hectares, a 7-percent decline from 1989. Total 1990 tobacco area will fall to an estimated 1.6 million hectares, though early indications of favorable weather in northern areas indicate production will fall only slightly from 1989.

China generally imports a small amount of high-grade flue-cured tobacco each year for blending purposes. These 1989 imports dropped 53 percent to 12,242 tons. Cigarette imports dropped 45 percent to 43.8 million pieces in response to surging domestic production, increased central government restrictions on imports, and increased fourth-quarter import prices because of the currency devaluation.

Table 12--Flue-cured tobacco prices, 1989-90

(Yuan/kg)	1989	1990
Top grade:		
Middle 1	5.60	5.60
Middle 2	4.30	4.30
Upper 1	4.10	4.10
2nd grade:		
Middle 3	2.84	3.20
Upper 2	2.52	2.90
Middle 4	1.80	2.10
Upper 3	1.60	1.90
Green 1	1.20	1.20
3rd grade:		
Middle 5	1.20	1.30
Upper 4	1.00	1.20
Green 2	0.50	0.50
4th grade:		
Middle 6	0.70	0.76
Upper 5	0.50	0.50
Green 3	0.20	0.24
Below grade:	0.10	0.16
Average price:	2.19	2.42

Source: Foreign Agricultural Service
Report #CH0034: 1990 Tobacco
Annual, p. 13.

On the export side, 1989 flue-cured tobacco sales rose 13 percent to 21,931 tons. First-quarter 1990 tobacco exports were 48.1 percent over the same period in 1989. The yuan devaluation, increased demand for foreign exchange to service the foreign debt, and the 1989 increase in tobacco production suggest that 1990 exports may continue the steady increase of the last half of the 1980's. However, the renegotiation of tobacco barter trade agreements with Eastern Europe, which receives over 40 percent of China's tobacco exports, into cash trade may force a temporary drop because of Eastern Europe's foreign exchange problems. In the long term, however, balance of trade pressures combined with steadily improving leaf quality should see China's tobacco exports continue to increase.

Tea Output Stagnates, Fruit Output Increases

In 1989, tea production dropped 0.5 percent to 540,000 tons. However, China's share of the world market increased because of record exports of 204,500 tons. Second only to India, China's trade in black, green, and specially processed teas has expanded to more than 80 countries.

Fruit output increased more than 10 percent in 1989 to nearly 18.4 million tons and fruit growing area reached 5.3 million hectares. Orange production increased 65 percent which reduced prices in the three major municipalities, Beijing, Shanghai and Tianjin, by close to 40 percent. The winter prices for apples fell approximately 15 percent from winter 1988. Orchards in Guangdong province, China's largest fruit producing area, reached 639,000 hectares in 1989 from 258,000 in 1985. Guangdong's total fruit output increased from 1.2 million tons in 1985 to nearly 2.8 million in 1989.

Fruit output (melons, apples, bananas, and lychee) in 1990 will likely increase at a slower pace than 1989 because of falling prices and increased tax rates. The long period necessary for fruit tree development means that 1990 apple and orange production will likely increase, despite the dramatic decline in prices and increased government disincentives.

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Livestock and Feed

China's livestock sector showed an unexpected rapid growth rate of 5.5 percent in 1989 over the previous year, particularly meat output, given the slow increase in feed grain production. Pork, the core of China's meat outturn, increased more than 1 million tons over 1988, much higher than the target increase of 200,000 tons set at the beginning of last year.

Food Basket Project Made Initial Success

The government's "Food Basket" project plans to build livestock breeding centers, feed processing plants, storage, and transportation systems in major cities to provide ample meat, fish, and vegetables for 200 million urban residents. The project was implemented in early 1989 and the central government granted 220 million yuan in loans. Many cities have made the program a priority because it concerns the quality of urban residents' daily life. Beijing, Tianjin, and Shanghai cities have invested 800 million yuan to build pig and poultry breeding centers, most of which have started production. The Ministry of Agriculture reports the project helped boost the country's red meat, poultry meat, and milk production in 1989.

Poultry, eggs, and milk production also grew steadily, ranging from 4 to 16 percent. (appendix table 3).

Pork Production Increased in Jilin Province

Jilin province, a major feed grain producing area, reported success in livestock breeding in 1989. For the first time in history, the province realized self-sufficiency in pork. In the past, Jilin exchanged about 2 million tons of corn with other provinces for 200,000 to 300,000 hogs every year.

High Prices Hindered Feed Development

China's feed industry developed rapidly in the 1980's. Output for 1989 reached around 30 million tons, 30 times that of 1980. However, rising prices of corn and soybean meal will begin to hinder further development of the feed industry. Since China's Government does not expect rapid growth of grain output in the 1990's, the Ministry of Agriculture emphasizes raising animals which are efficient converters of grain to meat.

The Ministry estimated that pork consumption will fall from the current 83 percent of total meat consumption to 78 percent by 1993. Poultry meat and nonred meat products will constitute a higher percent of consumption. By the end of the century, China's annual meat output should reach 33 to 34 million tons, up about 44 percent from 1989; output of eggs and poultry meat each about 14 to 15 million, up 101 and 350 percent, respectively, from 1989; and milk, 10 to 12 million tons, up 258 percent from 1989.

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Changes In Urban Household Consumption Patterns

Prior to 1979, China had a centrally planned economy where supply and equity considerations guided demand. Since then, China has gradually changed to a mixed economy operating under both state planning and market forces. Under this structure, stronger consumer demand pushed prices of food and goods higher, particularly at the end of the 1980's.

During the 1980's, there were notable changes in household consumption patterns. First, for urban households, expenditures on food items as a proportion of total expenditures (known as the Engel coefficient), especially for food grains, exhibited a declining trend. The decline was caused mainly by the decreases in the expenditure share of food grain. The increased expenditures on nonstaple food, such as edible oil, pork, and eggs, were significant during 1981-87. For example, per capita annual consumption of the three commodities grew 34, 11, and 26 percent, respectively, during the 6 years. The second notable change in household consumption was the surging demand for consumer durables such as color TV's, washing machines, and refrigerators.

Despite the significant infusion of free market forces since 1979, the rationing system remains an important factor affecting the total consumption of urban households. In general, rationing distorts China's markets because consumers cannot purchase the desired quantities under given (controlled) prices. Since consumers spend less than desired amounts for goods and services, such as food grain and housing, they may concentrate their marginal purchasing power on certain nonrationed goods. A recent study (Wang) concluded that this "spillover" effect exists in China's mixed economy. Preliminary results show that, for example, a 1-percent increase in the rationed quantity of grain would increase the price of nonstaple food by 0.82 percent and decrease the price of nonfood items, such as tobacco, liquor, and tea, and services by 0.45 and 1.72 percent, respectively.

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China's Agricultural Trade in the 1980's: Policy Changes and Performance

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Abstract: China's agricultural trade under the guidance of government policies expanded rapidly in the 1980's. Because exports increased faster than imports, the surpluses helped reduce China's total trade deficits. Agricultural export patterns are diversifying. In the 1990's, agricultural trade will continue to expand but at a much slower rate. Imports are expected to be tightly controlled, particularly in the early 1990's.

Keywords: China, agricultural trade, imports, exports, trade policy, performance.

China's agricultural trade expanded rapidly in the 1980's, guided by government trade policies. Annual value growth rates averaged close to 12 percent from 1983 to 1989. Exports grew at an average rate of 13.4 percent per year, compared with 9.4 percent for imports. The faster expansion in exports, especially to Asian markets, enabled China to have agricultural trade surpluses since 1983 which helped reduce the country's total trade deficits.

In general, imports and exports of basic commodities, such as grains, oilseeds, and cotton, dominated China's agricultural trade in the 1980's. However, toward the end of the decade exports started to diversify.

In the 1990's, China's agricultural trade is expected to expand, but at a much slower rate. Austerity programs imposed in 1988 because of high inflation rates will continue to slow the growth of the economy. Despite easing credit conditions in early 1990 and maybe next year, China may even more tightly control its imports, including many agricultural products. Agricultural exports are expected to grow, but at a much slower pace.

Policy and Trade System Modified

China is a socialist country with a planned economy, although some market forces have been incorporated into the economy during the last decade. The government set up a state trading system to manage international trade, including agriculture. The government has significant authority to use trade to achieve not only economic but political objectives. In practice, MOFERT makes annual and medium-term foreign trade plans under the guidance of the State Planning Commission. The plans are implemented by state-owned Foreign Trade Corporations (FTC's) and their subordinated Foreign Trade Bureaus at local government levels.

In agricultural trade, the state-owned China National Cereals, Oil and Foodstuffs Import and Export Corporation (CEROILFOOD), China National Native Produce and Animal Byproducts Import and Export Corporation

(CHINATUHSU), and China National Textiles Import and Export Corporation (CHINATEX) handle most of basic commodity imports and exports.

The main objective of China's foreign trade, like many developing countries, is to import advanced technology and equipment which the country does not produce or has only in limited quantities. The volume of such imports is heavily dependent upon exports. China makes great efforts to export agricultural commodities, raw materials, and light industry products to earn as much hard currency as possible. Meanwhile, the country limits unnecessary imports by imposing quotas or planned targets to save foreign currency. China's agricultural trade in the past 10 years has been closely guided by policies and programs to achieve this objective.

A secondary objective of the agricultural trade is to balance domestic demand and supply for certain basic commodities. For example, rice exports and wheat imports are often used by China's officials to demonstrate this objective. China has other specific programs related to agricultural commodity trade. During the late 1970's and the early 1980's, the government allowed more grains, particularly wheat, to be imported to urban areas so farmers could retain more grains for their own consumptions. While China managed to sharply increase grain output in the mid-1980's, the government ordered a drastic cut in grain imports and vigorously expanded grain exports, mostly corn, to Asian markets. In the late 1980's, the government started importing more grains because of stagnating domestic production and increased domestic demand.

Since 1987, the government has promoted exports through contracts signed between FTC's and provincial or local trade corporations. The contract includes targets for total foreign exchange earned from exports; the amount of foreign exchange to be transferred to the central government; and the responsibility for accounting and financial profits or losses (5).

Authorities classify agricultural commodities for export into three groups. Those in the first group, such as rice, soy-

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More Trade Statistics Are Published

China's foreign trade statistics have been compiled by the General Customs Administration and the Ministry of Foreign Economic Relations and Trade (MOFERT) using different procedures. MOFERT uses data on the trade activity of factories, mines, and other enterprises officially authorized to engage in foreign trade. For example, all retail sales made in China's domestic foreign currency stores (including Friendship Stores, overseas Chinese Stores, and the Guangzhou Trade Fair).

China's Customs Administration views trade as the physical movement of goods. It compiles statistics from customs declaration forms that include virtually all goods which move across China's borders. Customs' statistics are grouped by the international trade classifications used by the United Nations' Statistical Office and are comparable to trade statistics compiled by other countries (3).

The Customs' statistics are used in this analysis because they can be grouped to estimate the value of China's annual agricultural trade. The following categories of the Customs' statistics, prefixed by SITC (Standard International Trade Classification), have been used to calculate China's agricultural imports and exports:

- 0 Food and live animals chiefly for food
- 1 Beverages and tobacco
- 2 Inedible materials, except fuels, including
 - 21 Hides, skins and furskins
 - 22 Oilseeds
 - 26 Textile fibers, excluding synthetic & regenerated
 - 29 Other animal and vegetable materials
- 4 Animal fats and vegetable oils.

Exports are valued on a FOB (free on board) basis while imports are valued on a CIF (cost, insurance, and freight) basis. (1)

beans, and cotton, may be exported only by designated central FTC's, because they are closely related to people's daily lives. In the second group, commodities such as rabbit fur can be exported only by designated provincial or local FTC's because of limited international markets. The last group includes all remaining commodities and can be exported by any local FTC's.

There are three groups of agricultural imports. The first group, such as wheat and corn, may only be imported by central FTC's. Wool and wood pulp included in the second group can be handled jointly by national and local FTC's.

The third category of items may be imported by all local FTC's.

China's Agricultural Trade Expanded In the 1980's

China's overall trade, except for 1982, expanded rapidly, averaging 12.3 percent annually between 1981 and 1989. In the last 7 years, China's agricultural trade contributed between 12 to 20 percent to overall trade and grew at a rate of 11.7 percent per year since 1983, the earliest year Customs' data were available. The share of agricultural trade to overall trade declined in the first half of the 1980's as agricultural commodity imports, such as grain and cotton, were sharply cut. The share rebounded slightly to about 15 percent in the second half of the decade as agricultural commodity imports resumed and grain exports expanded.

From 1983 to 1989, agricultural trade surpluses helped import advanced technology and equipment the country needed to modernize its industry. The surpluses, as high as \$4.4 billion in 1986 and \$4.1 billion in 1987, significantly reduced the country's overall trade deficits incurred in most of the 1980's (fig. A-1).

China's agricultural trade surpluses increased rapidly in the mid-1980's, because the country sharply cut some imports and expanded others when crop production peaked in 1984 (fig. A-2). China started shipping more corn, oilseeds, including soybeans, and cotton to Japan, South Korea, the Philippines, Malaysia, Hong Kong, Singapore, Indonesia, and other Asian countries. The decision was made mainly because of the lack of local transportation and storage capacities. Rather than stockpile crop surpluses, some areas, especially the Northeast region, found it profitable to export.

In the mid-1980's, corn and cotton imports were largely eliminated for a number of years and wheat purchases were

Figure A-1
China's Total and Agricultural Trade

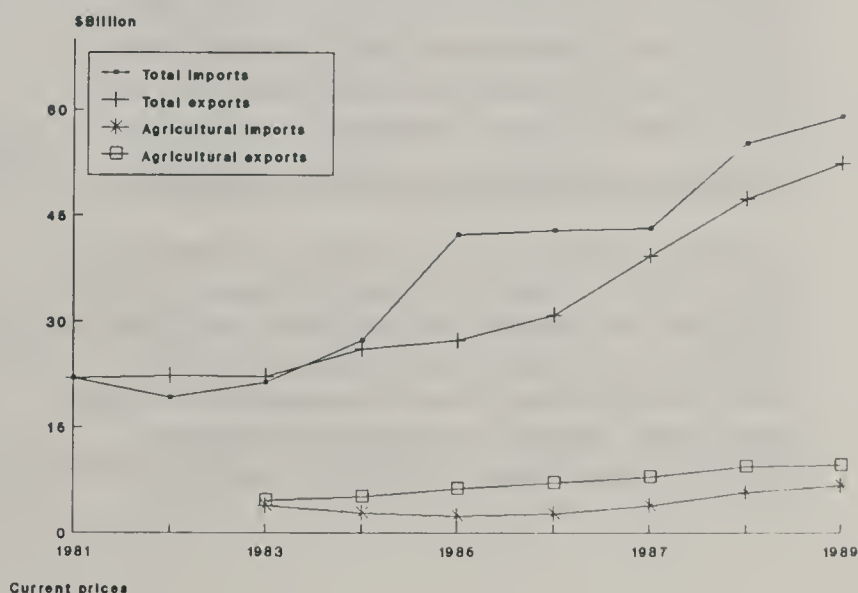


Figure A-2
Major Agricultural Commodity Exports

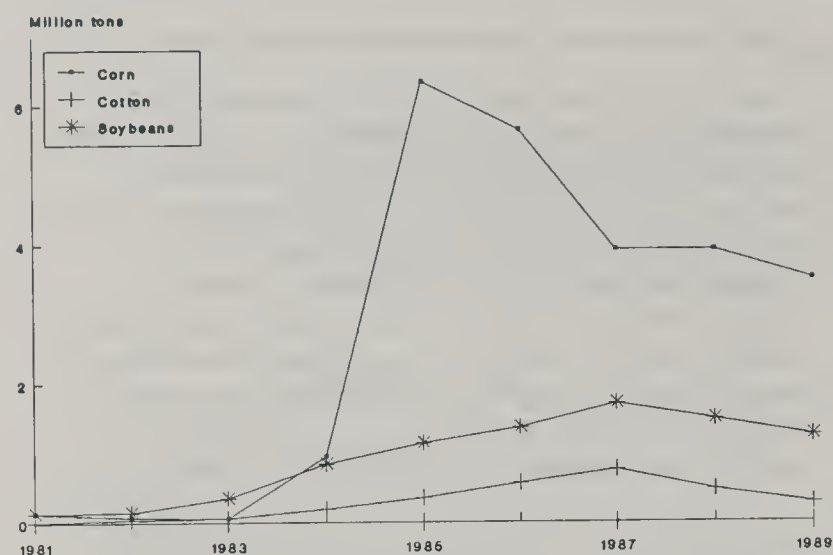
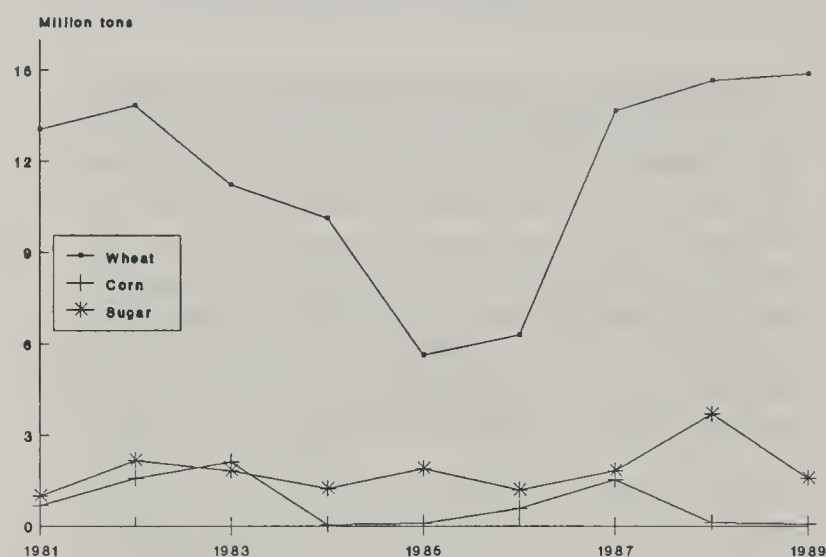


Figure A-3
Major Agricultural Commodity Imports



reduced to only about 6 million tons in 1985 and 1986, compared with the high of 14 million tons in the early 1980's. However, the trade surplus was gradually reduced in the latter half of the 1980's because commodity production stagnated and domestic demand expanded (fig. A-3).

Trade with Pacific Rim Countries Remained Significant

For the last two decades, Pacific Rim countries have been China's major agricultural trade partners because of location and cultural ties. The major ones are Japan, Hong Kong, the Philippines, Malaysia, Singapore, Indonesia, Thailand, Macao, the United States, Canada, Australia, New Zealand, and the USSR. Despite a rapid decline in agricultural imports from these countries, their share of agricultural trade

to China's total agricultural trade decreased only marginally and remained high, 70 percent at the end of the 1980's (table A-1).

In value terms, Hong Kong, Japan, the USSR, the United States, and Singapore have been China's most important Pacific Rim agricultural export markets in the last few years. Hong Kong was China's largest market because it transhipped to the United States, South Korea, Taiwan, and other countries. China's most important sources of agricultural imports, mainly grain and wool, have been the United States, Canada, Australia, and New Zealand.

Patterns of Agricultural Trade Started Changing

Imports have not diversified, because only traditional commodities — grain, oilseeds, and cotton — are imported to meet the demand of city residents and to develop textile exports to earn foreign exchange. Imports of other agricultural products have been strictly limited by the government.

Agricultural exports, however, have become very diversified. Along with grains and cotton in the late 1980's, China expanded exports of other agricultural products, except animal fats and vegetable oils (table A-2). Besides fresh vegetables, fruits, and oilseeds, many of the goods were processed, for instance, feed and canned food. China will have to expand these kinds of exports to keep agricultural trade growing. China's agricultural production is expected to grow slowly in the 1990's but domestic demand will rise, so little growth can be expected from traditional exports.

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Table A-1 -- China's agricultural trade with major Pacific Rim countries, 1984-89 1/

	1984	1985	1986	1987	1988	1989
Million \$						
Ag imports	2,752.7	2,446.4	2,736.6	3,888.0	5,827.5	6,705.1
From PR countries	2,313.3	2,018.0	1,944.9	2,870.8	3,722.3	4,319.9
Ag exports	5,233.3	6,280.0	7,115.8	8,027.1	9,456.7	9,702.2
To PR countries	3,476.2	4,474.2	5,013.4	5,769.0	6,919.9	7,093.0
Total ag trade	7,986.0	8,726.4	9,852.5	11,915.1	15,284.2	16,407.3
With PR countries	5,789.5	6,492.2	6,958.3	8,639.8	10,642.2	11,412.8
Percent						
Ag imports	100	100	100	100	100	100
From PR countries	84	82	71	74	64	64
Ag exports	100	100	100	100	100	100
To PR countries	66	71	70	72	73	73
Total ag trade	100	100	100	100	100	100
With PR countries	73	74	71	73	70	70

1/ Pacific Rim countries include Hong Kong, Japan, the Philippines, Malaysia, Singapore, the United States, Macau, Indonesia, Thailand, Canada, Australia, New Zealand, and the USSR.

Source: (2).

Table A-2 -- Composition of China's agricultural trade, 1983-89

	1983	1984	1985	1986	1987	1988	1989
Thousand \$							
Imports:							
Food, livestock	3,116,060	2,215,444	1,556,502	1,614,049	2,444,032	3,475,900	4,192,680
Grains	2,457,362	1,720,845	971,594	982,330	1,689,294	1,854,790	2,983,160
Sugar	440,401	248,172	283,223	217,435	299,436	866,060	441,490
Feed	76,054	88,052	84,711	98,019	135,550	324,390	324,400
Beverages & tobacco	46,490	118,491	208,363	175,211	263,427	345,900	201,470
Inedible material	963,451	780,108	1,313,611	1,288,543	1,389,895	2,198,140	2,457,240
Hides	56,011	39,345	103,814	76,839	68,109	70,480	43,830
Oilseeds	1,053	1,030	923	63,407	61,559	37,780	13,960
Textile fibers	540,522	225,694	354,619	518,171	569,936	1,384,310	1,264,760
Animal fats & veget oils	69,889	77,513	123,758	208,384	351,380	368,920	875,280
Veget oils	52,154	54,069	89,757	184,479	316,010	323,190	839,430
Total ag imports	3,905,887	2,752,690	2,446,362	2,736,649	3,887,999	5,827,500	6,705,140
Exports:							
Food, livestock	2,848,104	3,106,487	3,868,986	4,522,098	4,794,342	5,890,540	6,144,690
Grains	213,949	442,289	1,083,223	899,427	580,151	681,700	719,130
Veget, fruits	803,806	794,000	840,314	1,112,280	1,292,031	1,617,390	1,623,190
Feed	197,009	216,496	241,455	422,981	489,920	862,670	743,570
Beverages & tobacco	103,746	105,504	107,995	120,357	175,371	235,510	313,720
Inedible material	1,495,217	1,883,621	2,167,065	2,355,871	2,975,788	3,256,350	3,157,690
Hides	87,837	111,224	121,150	123,772	136,990	176,410	122,170
Oilseeds	320,119	471,720	483,049	573,216	678,826	683,530	645,260
Textile fibers	671,327	878,806	1,157,534	1,164,397	1,513,194	1,672,010	1,545,820
Animal fats & veget oils	104,565	137,668	135,993	117,496	81,551	74,330	86,060
Veget oils	103,487	136,754	134,927	116,676	79,635	72,410	82,660
Total ag exports	4,551,632	5,233,280	6,280,039	7,115,882	8,027,052	9,456,730	9,702,160

Source: (1,2, and 4).

The Agriculture Bank of China's Role in Funding Agricultural Investment

Hunter Colby*

Abstract: Although China's rural reforms have increased agricultural production and efficiency, investment levels have fallen dramatically. The principal new channel for agricultural investment, the Agriculture Bank of China, has been unable to effectively replace the old system of centralized and collective investment allocation. Organizational impediments and conflicting responsibilities have hindered the Bank's development as a vehicle for mobilizing and distributing funds for agricultural investment.

Keywords: Agriculture Bank of China, agricultural investment, Rural Credit Cooperative, farm product procurement.

The Agriculture Bank of China Reestablished

Absorbed into the People's Bank of China (PBOC) in 1963, the Agriculture Bank of China (ABC) was reestablished as a specialized bank in February 1979 to handle rural credit. The ABC was intended to be the cornerstone of agricultural development investment, filling the void created by the rapid disappearance of the collective system's agricultural accumulation (16, p. 90).

In conjunction with Rural Credit Cooperatives (RCC), the local arm of the rural banking system, the new ABC was charged with collecting and managing rural savings accounts, overseeing RCC operations, granting development loans to rural businesses and farm production units, handling state subsidies for rural areas, and financing state grain purchases. This was expanded to include collecting some urban deposits, handling foreign exchange deposits, and managing and funding rural trust and investment corporations. By the end of 1988, the ABC system consisted of almost 50,000 offices, including 2,173 county branches, 30,045 business offices, and 17,182 savings offices (11, 1989, p.678).

In 1984, the ABC was severed from the People's Bank of China and technically became an independent and self-supporting institution (e.g., responsible for profits and losses rather than an agent of the PBOC). At the same time, RCC's were put under the control of their owner-members to increase lending control and flexibility. However, in practice the RCC's continue to be closely integrated with the ABC through redeposit requirements, direct coordination of RCC activity by ABC personnel, and other management controls.

Changes In China's Rural Financial System

China's rural financial system changed significantly following economic reforms in 1978. Reduced state intervention in rural economic activities, decentralization of control over investment decisions to the provincial and local level, and a

restructured banking system created a more diversified and complex rural financial landscape. First, the household land contract and then the procurement contract systems were instituted throughout China, partially disengaging the state apparatus from day-to-day agricultural production decisions. Second, the financial relationship between upper and lower levels of the government was fundamentally altered as a tax based system of financing government operations was implemented. And finally, several specialized banks, one of which was the ABC, were established to handle most sector-specific investment finance and management, a task that had previously been the sole responsibility of the state or its agents (e.g., collectives).

As a result of these changes, however, China's state investment in agricultural production over the last decade underwent a serious decline, potentially jeopardizing long-term agricultural growth (table B-1). The ABC, the principle new channel for distributing rural investment funds, has not filled the vacuum in agricultural production investment prompted by reduced state agricultural investment allocations. Instead, the principal beneficiaries of ABC rural credit allocations have been township and village enterprises (TVE), the state farm sector, and state agricultural product procurement institutions.

The ABC Loan Portfolio

ABC funding of agricultural investment has remained low (table B-2). In 1979, of 45.1 billion yuan in total lending, just less than one-quarter was devoted to agriculture. By 1988, agriculture's share had declined to only 13 percent or 33.8 billion yuan. From 1979 to 1988, of total agricultural lending of just over 185 billion yuan, the respective investments in grain production and livestock were only 55.6 and 7.4 billion yuan (1, 1989, p. 114). When the ABC ceased acting as an agent of the PBOC and formally adopted lending to TVE's in 1984, agriculture's share of total ABC lending immediately fell by 8 percent. Since that time, agriculture's share has consistently remained between 11 and 13 percent of the total loan portfolio. In contrast,

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Table B-1--State agricultural capital construction investment, 1979-88

Year	Total	Crops	Live-stock	Forestry	Aquatic products	Water conserv.	Meteorology	Services
million yuan								
1979	5792	614	986	362	282	3496	52	--
1980	5203	2117	--	379	--	2653	54	--
1981	2921	1137	--	285	149	1313	35	--
1982	3412	1274	--	325	--	1774	39	--
1983	3545	1115	--	269	--	2110	51	--
1984	3712	1360	--	308	--	1982	62	--
1985	3694	729	195	353	117	1802	103	395
1986	3666	699	157	281	141	1736	160	492
1987	4282	655	205	437	220	2118	71	576
1988	4719	577	335	527	235	2362	101	582

Sources: (11, 1986, p. 452); (11, 1988, p. 572); (11, 1989, pp. 488, 490).

Table B-2--Agriculture Bank of China yearend loan portfolio, 1979-88 (billion yuan) 1/

Loan recipient	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Total loans 2/	45.1	67.2	\ 69.0	\ 70.5	72.2	148.2	169.6	199.7	232.3	262.8
Commerce	32.2	49.6	\ 49.5	\ 47.9	\ 46.9	102.8	111.1	124.2	138.9	156.9
Crop procurement	--	--	--	--	--	--	--	(62.7)	(69.0)	(79.0)
Industry	*	*	*	*	*	\ 3.5	6.9	9.9	13.4	15.5
Township & village enterprises	2.6	5.3	6.2	7.3	8.0	18.8	24.7	28.8	34.9	40.7
Agriculture	10.5	12.2	11.9	13.3	14.8	17.9	18.7	24.2	28.2	33.8
State agric. enterprises	(0.6)	(0.8)	(1.4)	(2.5)	\ (3.8)	(5.1)	(6.0)	(9.0)	(11.1)	(13.4)
Collectives	(8.8)	(10.2)	(9.3)	(9.2)	(8.4)	(7.7)	(6.6)	(8.1)	(7.2)	(8.3)
Individuals	(0.4)	(0.4)	(0.5)	(0.9)	(1.9)	(4.4)	(5.4)	(6.4)	(7.9)	(8.7)
Crop advances	(0.7)	(0.8)	(0.7)	(0.7)	(0.7)	(0.7)	--	--	--	--
Interest subsidies 3/	--	--	--	--	--	--	--	--	(1.3)	(2.7)
Rural Credit Cooperatives	0.5	0.8	1.4	2.0	2.5	3.1	3.3	4.2	3.6	3.4
Other	--	0.2	*	*	*	2.1	\ 4.8	9.2	9.3	13.3
Redeposits w/ People's Bank of China	--	--	--	5.4	--	--	24.3	--	--	--
Cash	--	--	--	--	--	--	4.7	--	--	--
Total Assets	--	--	--	--	--	151.5	198.6	--	--	--

* = figure included in the preceeding category

\ = estimated

-- = data not available

1/ The data has been collected from a wide range of sources. Most sources did not identify whether their total numbers were for total assets or for total loans. Other sources did not specify whether data was in the form of net loan increase over a period of time or year-end loan balance. In addition, sources used different loan recipient categories. And finally, as the ABC acted as an agent of the PBOC and other specialized banks between 1979 and 1983, it was difficult to determine whether or not the ABC loan figures included loans for which the ABC merely acted as agent rather than the loan originator. Efforts were made to identify and correct for these inconsistencies, though undoubtedly errors remain. Therefore, the data should be viewed more as an indicator of credit trends rather than as an absolutely accurate representation of specific ABC loan figures.

2/ Due to rounding, multiple sources and missing categories, total loans may not equal the sum of the parts.

3/ Program to provide interest subsidies for loans to poor peasant households began in 1987.

Sources: 1979-80: (1, 1989, p. 113-14); 1979-82: (11, 1983, p. 450); 1980-81: (11, 1981, p. 399); 1981-82: (19, p. 116); 1981-85: (1, 1986, p. 327); 1984-85: (12, pp. 69-70); 1985: (20, p. 249); 1986-88: (1, 1989, p. 113).

between 1984 and 1988 the share of ABC funding for TVE's rose from 11 percent to 15 percent.

The most important component of ABC credit activity, however, has always been loans to commercial enterprises, generally to government or collective supply and marketing enterprises and grain (purchasing) bureaus. Between 1979 and 1988, commerce loans grew from 32.2 to 156.9 billion yuan. Although the share of total ABC loans dropped from 71 to 60 percent during that period, the value increased by more than 487 percent. Approximately 50 percent of commerce loans or almost one-third of total ABC loans have been for crop procurement.

The data for ABC agriculture credits show several interesting loan disbursal patterns, including a decrease in the share to collectives and an increase in the share to state agricultural enterprises and individuals (fig. B-1). Although agriculture's share declined, the value and share to state agriculture enterprises and individuals increased. Of the remaining loan types, advance payments to peasants is quite low given the fact that approximately 20 percent of procurement funds are in this category (14, p. 14). This may in part be explained by the Industrial and Commercial Bank of China's responsibility for disbursing advance payments and purchase loans for grain intended to go into state reserves (3, p. 6). Therefore, ABC advance payment credits would only be required for nonreserve grain contracts and then only if the grain station was in need of funds. Interest subsidy loans, introduced in 1987 and funded by an annual People's Bank of China (PBOC) allocation, account for less than 8 percent of total agriculture credits.

Although state agricultural enterprises saw a large increase in credits, much of this went to state farm run industrial enterprises rather than agricultural development. Between 1980 and 1988, the total national gross value of industrial

output (GVIO) and agricultural output (GVAO) increased 3.5 and 3.1 times, respectively. In contrast, over the same period state farm GVAO grew 3.5 times and GVIO 5.2 times (11, 1989, p. 17). The unusually high growth in state farm GVIO relative to national GVIO supports the idea that more ABC state farm credits go toward industrial projects than agricultural production.

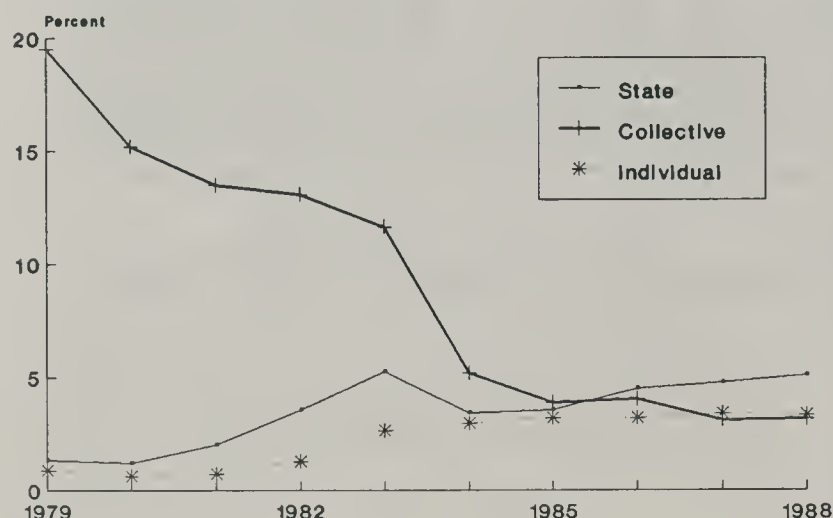
The rise in share of individual ABC credits, primarily between 1985 and 1988, is probably the result of rapid growth in the rural individual economy. As many of the rural collectives were gradually replaced by specialized households moving into sideline light industry or processing activities, ABC lending to collectives declined both in nominal and real terms while lending to individuals increased (20, p. 252). Although relatively small amounts, short repayment schedules, and higher interest rates made individual loans attractive to the ABC, by 1988 they only accounted for around 26 percent of direct agricultural credits or 8.7 billion of total ABC lending.

The ABC has only marginally fulfilled its state-mandated responsibility to push forward agricultural development (table B-1). Although news commentary from China generally blames declining ABC investment on the state's failure to effectively guide its lending practices, the situation is much more complex. The problem involves the organizational structure of the ABC system, including its relationship with the RCC; and its dual role as an independently operated and self-funded financial institution and as an instrument of state policy responsible for certain unprofitable credit activities (e.g., funding state agricultural procurement).

Organizational Impediments

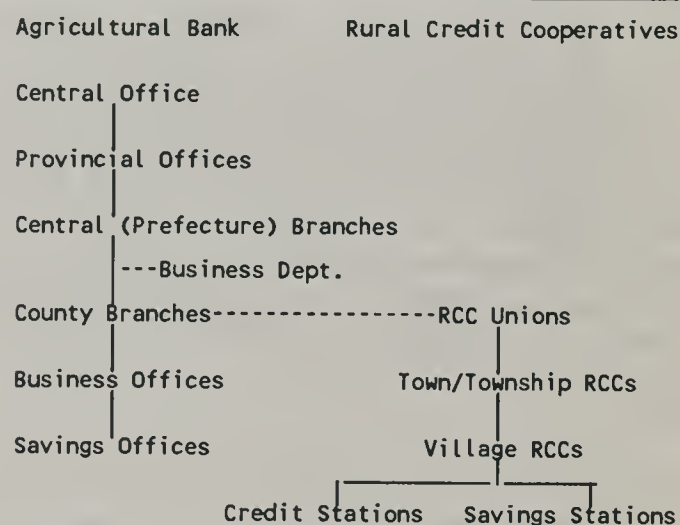
The ABC system has two distinct operational levels (fig. B-2). Policy and credit planning and implementation are primarily handled through the central and provincial offices, while city-center, county, and township branches handle

Figure B-1
ABC Agriculture Loans as a Share
of the Bank's Total Loan Portfolio



Source: See table B-1

Table B-2--ABC and RCC structure and relationship



Sources: (11, 1989, p. 678); (13, p. 13).

deposit collection and credit and subsidy disbursal (12, p. 66). In addition, transactions between ABC offices not specified in the head office credit plan are restricted. Central ABC funds, therefore, are allocated from above (though local branches and local governments are now consulted during plan preparation [20, p. 252]) and generally cannot be diverted to adjust for funding shortages or surpluses at other ABC offices on the initiative of any individual branch (12, p. 68).

Even in those cases where inter-branch fund transfer is authorized through the official credit plan, local officials consider local bank funds to be local resources and often work to limit or prevent movement of funds to other branches or loans to enterprises and institutions based in other counties or provinces. Local governments are also able to apply a great deal of pressure to ABC branches to provide particular types and amounts of credit (12, p. 67), though new bank regulations have attempted to reduce the pressures on branches by requiring either multiple bank officer approvals or higher level bank branch approval for particular types and amounts of loans that the branch feels may be unwise credit risks (20, p. 252).

Relationship with Rural Credit Cooperatives

The most important aspect of the ABC system's structure is its relationship with the Rural Credit Cooperative system. The ABC uses the Cooperative network of 397,000 rural offices to mobilize rural household savings deposits. Through redeposit requirements the ABC receives around 30 percent of total RCC deposits, though in 1986 the reserve ratio was reduced to 20 percent for RCC's in poorer counties (12, p. 67; 20, pp. 256-7). Working from 1987 and 1988 yearend RCC deposits, a 30-percent reserve ratio would amount to 55 and 57 billion yuan in funds for the ABC's and account for 37 and 33 percent of the 1987 and 1988 ABC yearend deposit balances (1, 1989, p. 113). Until 1988, when ABC household deposits reached 34 percent of total deposits, RCC deposits were consistently the single largest component of ABC funds.

In addition to redeposit requirements, the ABC has a host of other institutional and regulatory controls over RCC activities. The ABC directly controls RCC loan quantities, types, and interest rates, and deposit interest rates. Local ABC branches have also imposed credit ceilings and geographic restrictions on RCC deposits and loans. And finally, the ABC tends to recruit much of its branch personnel from RCC offices, thereby increasing the quality of ABC staff and relegating RCC's to operate with less able or qualified staff (12, pp. 71-5).

The ABC's relationship with the RCC system is important because it promotes the extraction of rural savings for rural industrial investment rather than back into agriculture. By yearend 1988, the balance of RCC deposits totalled 140 bil-

lion yuan. Significantly, 82 percent of those deposits were from rural individuals (1, 1989, p. 113). RCC loans to rural enterprises accounted for about 50 percent of RCC funds after ABC redeposit requirements. Loans to individuals climbed to 19.4 billion yuan by yearend 1985, of which 97 percent were short-term working capital loans and only 3 percent were longer maturity (3 year) loans for fixed capital or equipment (20, p. 258). RCC loans to individuals were generally used for seasonal production working capital needs rather than improvements in either land or equipment. In other words, the distribution of funds deposited in RCC's through both the ABC and the RCC's has been biased towards nonagricultural and short-term working capital loans.

Conflicting Responsibilities

The ABC is constrained by the conflict between its state mandated responsibility to finance agricultural procurement on the one hand while trying to maintain a profitable loan portfolio. Township and city grain stations obtain loans from the ABC until funding can be received from the Ministry of Finance (3, p. 6; 5, p. 5). In fact, all credit allocations below the county level, including those for cotton, grain, and oilseed purchasing stations, basic-level grain storage facilities, and some grain and oilseed processing plants and feed processing mills, are the responsibility of the ABC. Credits for the county level and above are provided by the Industrial and Commercial Bank of China (ICBC) (21, p. 75). The ICBC is also responsible for grain reserve purchases and subsidies to grain stations to cover the difference between grain purchases and retail prices. The Ministry of Finance directly funds larger municipal grain station procurements (4, p. 13). In 1989, ABC credits accounted for nearly 62 percent of the total 300 billion yuan needed for procurement (9, p. 2).

Even though the ABC does not fund all state procurement, the ABC must nonetheless seasonally guarantee the availability of the majority of needed credit. Between 1979 and 1988, the drain on ABC funds dramatically increased as total state grain procurement climbed from 72 to nearly 138 million tons (17, p. 10) and as the average procurement price rose from 297 to 514 yuan per ton (18, p. 12). More specifically, between 1985 and 1987, ABC's granted 346 billion yuan in procurement loans (10, p. 30), and by yearend 1988 there was a balance of 80 billion yuan in procurement loans. In 1989, 185 billion yuan in ABC credits were used for agricultural and sideline product procurement, nearly 62 percent of the total 300 billion yuan necessary for procurement (9, p. 2).

The conflict for the ABC lay in the revenue loss caused by providing low-interest procurement loans and by its inability to make other more profitable loans during the peak summer and winter procurement periods. In addition, state lending policies and regulations have meant that around 60 percent of all ABC credits were disbursed at low interest rates (22, p.

38). The ABC accordingly had the lowest earnings differential of all of China's specialized banks (15, p. 44).

The monthly rate for ABC procurement loans was 0.84 percent. In order to cover temporary funding shortages during peak crop procurement periods, the ABC was frequently required to undertake short-term borrowing from the PBOC at a monthly rate of 1 percent. The interest rate for ABC savings deposits (a major and increasing component of ABC funds) was 0.68 percent a month, to which was added a 0.88 percent monthly cost of operation (15, p. 43). Between limiting the availability of funds for better earning nonprocurement loans and the interest fees the ABC usually paid to the PBOC in order to fulfill its crop procurement responsibilities, the ABC had only a very limited ability to contribute to agricultural production investments. Furthermore, the need to make up for the losses caused by the procurement fund system moves ABC officials to prefer the safer, higher return, and generally short-term rural enterprise loans over most types of agricultural loans.

Current Trends and Future Outlook

Despite the severe monetary austerity program during 1989, central and provincial level officials call for increases in agricultural investments for 1990. The ABC announced a 2-percent increase in the share of agriculture loans for 1990 and 1991 (6, p. 24), 34.5 and 35.2 billion yuan. To extend available funds, the ABC central office has also decided to reduce the profit remission quotas of branches whose incomes are affected because of issuing low-return loans for the purchase of farm machinery (6, p. 24). On the provincial level, Heilongjiang announced an 11-percent increase for 1990 agriculture loans (7, p. 43), while Sichuan announced a 3-percent increase in agricultural capital construction investment loans (8, p. 6).

Although the 1990 and 1991 national ABC agricultural credit targets indicate a new interest in investment, the nominal increases would be quite small and inflation would likely mean actual real decreases. For the long run, there are few indications that the government's new attention to agricultural investment will address either the ABC's underlying organizational problems or the difficulties associated with funding the state agriculture procurement system. Unless the bureaucratic inefficiencies within the ABC system can be improved and the fundamental conflict between ABC credit disbursal policies can be resolved, the proposed infusion of additional credits will provide only a temporary fix for the shortage of agricultural investment funds. In the current climate of political, fiscal and monetary conservatism, however, the near future holds little likelihood of any fundamental reformulation of either ABC organizational structure or procurement responsibilities.

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Regional Crop Production Patterns in China

Shwu-Eng H. Webb*

Abstract: China's different climates, topology, and soil conditions across regions result in diverse crop production patterns. A simple ranking test is used to compare variable costs and net returns of producing five major crops in each region with their shares of regional sown areas. The results indicate that the grain self-sufficiency goal and inadequate transportation infrastructure inhibit regional specialization.

Keywords: Regional specialization, crop production, net returns, resource allocation, comparative advantage.

China is the third largest country in the world, covering 9.6 million square kilometers, with many different climates, topology, and soil conditions across regions. Consequently, crop production patterns and the resulting resource allocation patterns are very diverse.

Government policy also affects crop production patterns, particularly the goal of grain self-sufficiency. At the producer level, self sufficiency for subsistence farmers has meant harvesting enough grain to meet family needs until the next harvest. At the provincial level, grain self-sufficiency has been imperative because poor transportation has made interprovincial trade extremely difficult. Even if a cash crop, such as cotton, is the most profitable, there is a strong incentive to maintain adequate grain supplies. At the national level, grain self-sufficiency has been a major policy goal of the government since the founding of the People's Republic of China.

This article examines the relative importance of natural resource endowments and self-sufficiency policy objectives in determining regional specialization of crop production. It begins with a definition of the seven major crop producing regions in China and gives an overview of the importance of regional production of various crops to the nation. Next, variable costs and net returns to fixed inputs are calculated for each region for four major grain crops — rice, wheat, corn, and soybeans - and the major cash crop — cotton. In the final section, variable costs and net returns of producing these five crops are compared with their share of the region's acreage to evaluate how grain self-sufficiency objectives and each region's comparative advantage determine its crop production patterns.

Regional Delineation

As shown in figure C-1, China is divided into seven major crop producing regions. The Northeast includes the provinces of Heilongjiang, Liaoning, and Jilin. The North includes the provinces of Shandong, Hebei, Henan, and Shanxi, and the two municipalities of Beijing and Tianjin.

The Northwest includes the provinces of Shaanxi, Gansu, and Qinghai and three autonomous areas of Nei Monggol, Ningxia Hui Nationality, and Xinjiang Uygur. The East includes Zhejiang, Jiangsu, Anhui, and the municipality of Shanghai. The Central includes Hubei, Hunan, and Jiangxi. The South consists of the provinces of Guangdong, Guangxi, Fujian, and Hainan. The Southwest includes the provinces of Sichuan, Guizhou, Yunnan, and Xizang (Tibet) Autonomous area.

Regional Distribution of Sown Area and Production by Crop

Total cultivated land in China is very limited. China accounts for about 22 percent (1.1 billion) of the world's population, but only 7 percent (95.6 million hectares) of global cultivated land. This works out to less than one-tenth of a hectare — .086 hectare — per person. Therefore, China must utilize its cultivated land intensively by planting and harvesting more than one crop per year in many areas.

Land Use in China

The "multiple cropping index" (MCI) measures the intensity of cultivated land use in a region in a particular year. The MCI is calculated as the ratio of total sown area to the quantity of cultivated land times 100. For example, the cultivated land in China in 1987 was 95.9 million hectares but sown area was 145 million hectares, making the MCI 151 percent (table C-1). On the average, peasants in China in 1987 harvested 1.5 crops from cultivated land. The MCI varies widely across China's major agricultural regions.

Table C-1 summarizes the distribution of total sown area and cultivated land by region in 1987. The North is China's largest crop producing region. In 1987, it accounted for 25.5 percent of the nation's total cultivated area and 25.3 percent of the sown area (table C-1). The South is China's smallest major crop producing region, accounting for 7.0 percent of total cultivated area and 9.2 percent of the sown area. The remaining sown area is distributed fairly evenly among the other five regions, ranging from 15.1 percent for the East to 11.2 percent for the Northeast.

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China's Crop Producing Regions



China devoted more than three-quarters of sown area to grains in 1987. Rice accounted for 22 percent, wheat 20 percent, corn 17 percent, and soybeans 6 percent (table C-2). Millet, sorghum, potatoes, and barley accounted for 15 percent of total sown area. Economic crops include cotton, oil-seed crops, fruits, sugar cane, sugar beets, tobacco, and other fiber crops, and accounted for about 15 percent. Vegetables, hay, and green manure together accounted for 9 percent.

Acreage Allocation Patterns In Each Region

The proportions of sown area allocated to various crops are considerably different from the national average for all regions. The one exception is the tendency in all regions to allocate 70 percent or more of the sown area to grain crops (table C-2).

Corn is the most important crop in the Northeast, accounting for 34 percent of this region's sown area. The most important crop in the North and Northwest is wheat, which accounted for 34 percent and 33 percent, respectively. The East double crops rice and wheat, and is the only region that can allocate more than 20 percent of sown area to each. Rice accounted for 33 percent of the region's sown area, and wheat 21 percent.

The Central probably has the most favorable climate for major crop production and the highest MCI, 221 percent. The region is China's biggest rice producer. About half of the sown area was devoted to it. The South can grow two rice crops a year and accounted for 57 percent of the sown area. The Southwest's sown area included rice, 22 percent; corn, 17 percent; and wheat, 14 percent. Miscellaneous grains are important in the Southwest just as the Northwest accounted for over 20 percent of the sown area in both regions.

Table C-3 shows the regional importance of major crop production. The North appears to be the most diversified crop growing region. It also was the biggest producing region for most of major crops, leading the nation in corn, cotton, wheat, millet, peanuts, and sesameseed. The East is China's largest rapeseed producing region.

Rice is the most important staple grain in China, especially in the South. The Central region was the biggest rice producer with 32 percent of the total, followed by the East (25 percent), South (20 percent) and Southwest (16 percent). The North accounted for 48 percent of wheat production, followed by the East (19 percent) and the Northwest (15 percent).

The production of the other two major grains was concentrated in the Northeast, North, and Northwest regions which accounted for 80 percent of the corn and 73 percent of the soybeans. About 80 percent of the sorghum crop is produced in the Northeast and North. Almost all of the sesame

seed production comes from the North, Central, and East (95 percent), while nearly all sunflower production is in the Northeast, North, and Northwest.

Costs and Net Returns of Production by Region

Table C-4 shows costs and net returns of producing selected major crops in 1987 by province based on sample survey 1/ data (2). Just as resource endowments vary widely from region to region, the costs of producing a given crop vary significantly from one province to another (table C-4). Given the resource endowments, average costs of production should broadly reflect the efficiency of a particular region in producing a particular crop. A low-cost region for wheat, for example, should have a high proportion of its land in that crop. But costs of production per hectare alone should not be used to evaluate a region's efficiency in producing a particular crop. Some high-cost regions can also be high-yield and high-profit regions. Hence, net returns per hectare are needed to supplement costs of production information.

Variable costs for producing rice ranged from a low of 785 yuan per hectare in Anhui in the East to 2021 yuan in Hebei in the North. Provinces in rice producing regions of the East and Central have lower-than-national average costs of production. Rice grown on limited acreage is a very profitable crop in the North. Because of strong taste preferences for the type of rice grown in the North, it commands a much higher price (about 50 yuan per 100 kilogram compared to the national average of 36 yuan) and makes the rice return the highest for any region (1970 yuan per hectare).

The North is the major wheat producing region and had the highest costs of production per hectare, 1,062 yuan. The North, however, is a high-yield region, with an average of 283 tons per hectare (the national average was 212). Combined with favorable prices, the North had the highest wheat net returns per hectare in China, 1025 yuan.

The major corn producing area, the North, had relative low production costs of 725 yuan per hectare. Corn net returns ranged from a negative of 103 yuan per hectare in Jiangsu to a positive of 1384 in Gansu province, with an average of 704 for the nation.

Variable costs of producing soybeans ranged from 362 yuan per hectare in Anhui of the East to 953 in Liaoning of the Northeast. Net returns ranged from a low of negative 169 yuan per hectare in Xinjiang to 1437 yuan in Henan, with an average of 716 for the nation. There are no survey data on soybean costs of production from the Central and South

1/Readers should use these costs of production data with caution. Only 426 hectares of 32.2 million hectares of rice were surveyed. Just as with any other costs of production survey, the accuracy of this survey depends on how representative the sample is and how clearly and consistently definitions, such as standard labor days are applied.

Table C-1-- Regional distribution of sown area and cultivated land in China, 1987

	North East	North	North West	East	Central	South	South West	Total
Sown Area (1,000 hectare)	16173	36695	17110	21917	20295	13286	19482	144957
Regional share of nation's sown area (percent)	11.2	25.3	11.8	15.1	14.0	9.2	13.4	100.0
Multiple cropping index (percent)	99.2	149.8	107.4	200.9	221.1	197.0	176.6	151.2
Cultivated area (1,000 hectare)	16295	24494	15924	10907	9179	6745	11033	95871
Regional share of nation's cultivated area (percent)	17.0	25.5	16.6	11.4	9.6	7.0	11.5	100.0

Source(2)

Source(2)

Table C-2-- Distribution of sown area by crop within each region in China, 1987

	North East	North	North West	East	Central	South	South West	Crop share of total	Total sown area 1,000 hectare
			-----	Percent	-----				
Grain	86.7	77.5	78.0	74.4	68.7	74.7	78.4	76.8	111268
Rice	9.2	2.0	1.9	33.1	49.7	56.8	24.5	22.2	32193
Wheat	10.2	33.7	33.2	20.8	7.9	1.2	14.1	19.9	28798
Spring	10.2	0.2	14.7	0.0	0.0	0.0	0.1	2.9	4243
Winter	0.0	33.5	18.6	20.8	7.9	1.2	14.1	16.9	24555
Corn	33.6	19.7	14.1	3.8	2.5	4.2	16.5	13.9	20212
Soybeans	20.3	5.9	3.6	5.0	2.4	3.1	2.0	5.8	8445
Other grain	13.4	16.3	25.1	11.6	6.2	9.3	21.2	14.9	21621
Economic	7.6	17.1	13.7	15.6	13.8	14.9	13.7	14.3	20724
Cotton	0.0	7.9	2.5	3.9	2.7	0.0	0.6	3.3	4844
Oilseeds	2.9	6.7	5.5	10.2	7.9	5.5	8.2	6.9	10046
Other eco. crops	4.6	2.5	5.8	1.5	3.2	9.4	4.9	4.0	5834
All Others	5.7	5.3	8.3	10.0	17.5	10.4	8.0	8.9	12964

Source: (2)

Table C-3-- Regional share of nation's production by crop in China, 1987

Crop	Northeast	North	Northwest	East	Central	South	Southwest	Total	Nation's production 1000 tons
	----- as percentage of nation's total -----								
Rice	5	2	1	25	32	20	16	100	174416
Wheat	4	48	15	19	5	0	9	100	87768
Spring	35	2	63	0	0	0	0	100	8895
Corn	32	37	11	4	2	1	12	100	79822
Cotton	0	60	8	17	13	0	2	100	4245
Soybeans	43	24	6	14	5	3	4	100	12184
Millet	20	63	16	0	0	0	0	100	4538
Peanuts	2	60	1	10	6	15	5	100	6171
Rapeseed	1	8	8	39	16	0	28	100	6605
Sesame Seed	1	43	2	20	31	2	1	100	526
Sorghum	47	32	10	3	1	0	7	100	5428
Sugarbeet	53	4	44	0	0	0	0	100	8140
Sugarcane	0	0	0	3	8	72	17	100	47363
Sun flower	33	16	50	0	0	0	1	100	1241

Source: (2)

which accounted for about 8 percent of the nation's soybean production and 10 percent of sown area.

The costs of producing cotton showed the least variation across regions among the five crops. These ranged from 1,348 yuan per hectare in Shaanxi province of the Northwest to 2,148 yuan in Jiangxi of the Central.

Costs and Profits of Producing Major Crops

Table C-5 summarizes the average variable and marginal costs and the average and marginal profits (net returns) of producing these five crops in China. Average variable costs per hectare and per-ton are calculated as a national weighted average (footnotes in table C-5). Marginal cost per hectare is defined as the cost per hectare from the highest cost pro-

ducing province in the survey. Marginal costs per ton would come from the area with highest per ton costs. Marginal profits are defined similar to their cost counterparts.

The marginal profits for all four of the grain crops are negative. Marginal profits came from the highest cost region. The objective of grain self-sufficiency is so important that these provinces will produce grains even when marginal returns are negative. On the average, cotton and rice are the most profitable crops among the five. However, cotton is the only profitable crop in the highest cost producing province. Despite higher net returns, all regions tend to restrain their cotton acreage. The North had the highest proportion of its land in cotton. Other regions allocated less than 4 percent of their sown area.

Table C-4. Variable costs 1/ and net returns 2/ per hectare of major crops in China, 1987

Region and Province	Rice		Wheat		Corn		Soybeans		Cotton	
	Variable Costs	Net Returns	Variable Costs	Net Returns	Variable Costs	Net Returns	Variable Costs	Net Returns	Variable Costs	Net Returns
Yuan per hectare										
Northeast	1358.4	1763.3	492.0	239.9	970.2	913.9	628.2	763.7	NA	NA
Heilongjiang	1674.5	-209.3	492.5	236.3	622.8	466.1	466.1	794.6	NA	NA
Liaoning	NA	NA	NA	NA	1065.0	1260.8	952.8	666.6	NA	NA
Jilin	1332.6	1924.2	479.4	349.5	1231.7	1026.3	915.5	732.9	NA	NA
North	1365.5	1969.5	1061.6	1024.8	725.4	899.6	569.5	997.3	1740.6	1996.5
Shandong	NA	NA	1134.3	1097.1	740.6	820.7	378.9	662.9	NA	NA
Hebei	2020.5	1469.7	1083.8	1143.0	725.4	805.7	NA	NA	NA	NA
Beijing	1675.7	1520.0	1008.9	747.3	715.2	1071.0	NA	NA	1981.8	2507.0
Tianjin	1128.0	2226.6	837.0	613.2	608.7	899.4	NA	NA	1714.4	2028.3
Henan	NA	NA	1062.0	1232.6	729.3	838.1	819.9	1436.7	1690.1	1794.6
Shanxi	NA	NA	1016.4	810.8	933.3	897.8	NA	NA	1806.2	2188.2
Northwest	1408.5	1208.6	896.7	825.5	770.6	789.0	409.8	664.2	1521.3	1275.7
Shaanxi	1302.2	1152.9	883.7	624.0	733.8	553.4	191.1	458.6	1348.1	1348.1
Gansu	NA	NA	1089.2	762.6	1425.8	1384.4	NA	NA	NA	NA
Nei Monggol	NA	NA	677.1	447.5	830.3	919.2	525.5	807.8	NA	NA
Ningxia	1570.5	1603.2	1126.8	992.4	638.1	304.8	NA	NA	NA	NA
Xinjiang	1358.3	1033.8	847.2	986.6	738.8	890.6	553.4	-168.9	1613.7	1237.1
Qinghai	NA	NA	966.3	1478.0	NA	NA	NA	NA	NA	NA
East	952.6	1098.1	867.0	624.6	777.8	1011.0	417.2	1154.0	1776.0	1574.2
Zhejiang	997.1	1018.7	834.2	482.7	594.9	-103.2	NA	NA	1814.3	1319.3
Jiangsu	1011.9	1432.7	871.5	1032.2	866.7	957.3	521.1	1067.6	2074.4	1942.4
Shanghai	993.2	744.5	848.4	310.4	NA	NA	NA	NA	1390.8	700.7
Anhui	784.7	1456.2	877.8	399.6	678.9	1262.7	361.7	1200.3	1497.5	1713.6
Central	1112.4	995.3	854.8	350.6	925.1	240.6	NA	NA	2009.2	1133.0
Hubei	1016.3	1009.5	NA	NA	1233.3	1207.2	NA	NA	1701.0	1418.6
Hunan	1214.3	1010.7	861.0	355.4	907.1	183.9	NA	NA	2000.7	1102.4
Jiangxi	943.7	876.0	459.2	39.9	NA	NA	NA	NA	2148.5	1559.4
South	1208.3	491.3	1103.7	59.3	746.3	85.7	NA	NA	NA	NA
Guangdong	1306.1	393.0	NA	NA	NA	NA	NA	NA	NA	NA
Guangxi	1175.7	513.8	NA	NA	746.3	85.7	NA	NA	NA	NA
Fujian	1113.2	593.4	1103.7	59.3	NA	NA	NA	NA	NA	NA
Southwest	1155.6	872.1	821.6	67.4	988.4	152.4	769.7	627.4	1828.2	259.7
Sichuan	1103.9	1285.8	803.3	172.4	1054.5	159.9	NA	0.0	1828.2	259.7
Guizhou	1130.7	1311.9	809.0	-13.8	971.3	258.5	783.3	726.0	NA	NA
Yunnan	1244.7	-121.5	941.0	-375.2	963.5	43.7	711.2	203.6	NA	NA
Xizang	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SSB total	1240.8	1061.4	890.3	572.7	858.9	704.0	598.4	715.8	1757.4	1509.0

Source: (2)

1/ Costs included in the survey are payments to variable inputs -- labor, seed, fertilizer, machine cultivation, irrigation drainage, draft animal expenses, and administrative and management costs.

2/ Net returns are defined as gross returns per hectare (the price paid to farmer times yield per hectare minus variable costs per hectare). Regional weighted average variable costs and net returns are calculated by using provincial sown area as weighing factor.

Table C-5-- Variable costs and net returns of producing major crops in China, 1987

Crop	Average Variable costs		Marginal costs		Average profits 5/		Marginal profits 5/	
	Per 1/ hectare	Per 2/ ton	Per 3/ hectare	Per 4/ ton	Per hectare	Per ton	Per hectare	Per ton
	----- in local currency, yuan -----							
Rice	1240.80	173.40	2020.50	442.40	1061.40	175.20	-209.25	-59.80
Wheat	890.25	280.00	1134.30	575.60	572.70	180.20	-375.15	-270.80
Corn	858.90	154.80	1425.75	327.20	703.95	149.20	-103.20	-64.80
Soybeans	598.35	293.40	952.80	868.00	715.80	400.40	-168.90	-259.40
Cotton	1757.40	1553.80	2148.45	2407.80	1509.00	1574.80	259.65	465.80

Source: Table C-4

1/ Average variable costs per hectare is defined as the average variable costs per mu times 15 (15 mu equals to 1 hectare).

2/ Average costs per ton will be the average costs per hectare divided by yield per hectare (which is expressed as kilograms per hectare) times 1000 kilograms.

3/ Marginal costs per hectare is defined as the costs per hectare from the highest portion cost producing province in the survey.

4/ Marginal costs per ton would come from the area with highest per ton costs.

5/ Average profits and marginal profits are defined similar to their cost counterparts.

Table C-6-- Rankings 1/ of Net returns, costs and share of region's sown area for 7 producing regions in China, 1987

Crop	Unit	Northeast	North	Northwest	East	Central	South	Southwest	Total
Rice	Net returns:	1	2	2	3	2	1	1	2
	Costs:	4	4	4	4	3	3	4	4
	regional's sown area (%)	4	5	5	1	1	1	1	1
Wheat	Net return:	4	3	3	5	3	2	5	5
	Cost:	1	3	3	3	1	2	2	3
	regional's sown area (%)	3	1	1	2	2	4	3	2
Corn	Net return:	2	5	4	4	2	2	4	5
	Cost:	3	2	2	2	2	1	3	2
	regional's sown area (%)	1	2	2	5	3	2	2	3
Soybeans	Net return:	3	4	5	2	NA	NA	2	2
	Cost:	2	1	1	1	NA	NA	1	1
	regional's sown area (%)	2	4	3	3	NA	3	4	4
Cotton	Net return:	NA	1	1	1	1	NA	3	1
	Cost:	NA	5	5	5	4	NA	5	5
	regional's sown area (%)	NA	3	4	4	4	NA	5	5

Source Table C-1 and C-2

1/ A rank of 1 for net return and sown area indicate that crop has the highest net returns and the most acreage respectively in that region. A rank of 1 indicates that crop has the least cost in that region.

A Comparison of Regional Production Patterns, Costs and Net Returns

The returns to land in China varied substantially among crops. Cotton had the highest net returns, 1509 yuan per hectare, rice 1061 yuan, soybeans 716 yuan, corn 704 yuan, and wheat 573 yuan (table C-5). China's welfare would likely increase if it could specialize in cotton and rice production and trade for grain crops such as wheat. Indeed, wheat had the lowest net returns per hectare among these five crops. To maintain grain self-sufficiency and reduce wheat imports, the government has used its pricing policy to encourage wheat production. The domestic price ratio of wheat to rice is just the reverse of the ratio of the world prices for these two grains (3). If international prices of these five crops are used, the net returns on cotton and rice would be even higher.

The grain self-sufficiency goal and limited transportation facilities tend to prevent China from increasing regional specialization in crops that have the highest net returns. Cotton, the most profitable, has the least acreage among these five crops. Wheat, has the lowest net returns per hectare, but is second to rice in acreage, 20 percent to 22 percent.

Table C-6 ranks five crops within each region based on three different criteria: (1) net returns per hectare; (2) costs per hectare; (3) proportion of the crop's sown area to the region's total sown area. The ranking order for these three criteria is from 1 to 5 within each region for the five crops. A crop with a rank of 1 has the highest net returns per hectare for the region, and a 5 indicates the lowest. The same ranking applies to a crop's share of the region's sown area. A rank of 1 indicates the least-cost crop within that region, while a 5 means the highest cost crop.

A region's production patterns are perfectly consistent with its economic efficiency if all crops receive the same ranks for each of these three criteria. For example, a rank of 1 for cotton in the North for all three criteria would indicate that it is the most profitable, has the least cost, and accounts for the most acreage in there. However, none of the regions has a perfect match of ranks in their major crop production patterns. When the net return ranking conflict with cost ranking, the former is the preferred criteria to be used.

Cotton had the highest net returns among all five crops for all regions, except the Southwest. Yet, it accounted for very small acreage in all regions. Even though it is the most profitable, it is a cash crop and can only be sold to the state. Peasants will grow cotton only if they are assured grain supplies. And like rice in the North, cotton has a high cost of production per hectare which tends to discourage peasants from growing it if procurement prices are not competitive.

Most of the rice grown in northern China is kept by peasants for their own use or sold at premium prices on local markets. This explains why rice in the Northeast and North had very high net return rankings. Rice in northern regions, however, was grown on a very small acreage share. The high cost per hectare and limited irrigation discourage peasants from growing rice in these regions.

With the exception of cotton and rice in northern regions, the ranking of acreage share is fairly consistent with the net returns expected and cost rankings for regions of the Northeast, Central and South. For the other four regions, the ranking of acreage share did not match too well with its expected net returns or costs of production. A more thorough analysis is needed to determine whether these differences are significant or the result of other factors.

Conclusions

The simple ranking test for comparing an individual crop's net returns and variable costs per hectare with its share of the region's sown area provide only a preliminary examination of the relative importance of natural resource endowments and the grain self-sufficiency objectives. If each crop is considered as an individual production activity and not as a crop rotated with other crops, the results of this simple ranking test suggest that the grain self-sufficiency goal and limited transportation infrastructure inhibit a region from specializing in crops with relative higher net returns.

However, this type of ranking test tends to distort the implication of production activity. For example, the East is a rice-wheat double crop region. Even though net returns from each individual crop of rice and wheat are not profitable, profits from double cropping could yield higher net returns than any other production activity. This would explain why rice and wheat acreage share in that region is high while net returns of the individual crops are low. The use of a combination of crops in a crop rotation scheme might be a more appropriate way to determine whether a region's production patterns are consistent with its costs and net returns.

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Allocation of Crop Sown Area: Analysis of Trends and Outlook for the Future

Frederick W. Crook*

Abstract: Newly published information provides researchers with the most comprehensive view in decades of China's cropping patterns. A combination of administrative measures, relative price changes, unit yields, and profit margins shifted area sown to specific crops. Rising population and decreasing cultivated land reduced per capita cultivated area by more than half from 0.188 hectares in 1952 to 0.086 by 1990. By the year 2000 cultivated land could be reduced to 0.074 hectares per person. Area sown to grain crops likely will continue to decrease, with more land for economic crops such as peanuts and sugar cane.

Keywords: Cultivated area, sown area, wheat, rice, coarse grains, cotton, oilseeds, sugar, tobacco, fiber, and other crops.

China's cultivated land base decreased from 107.9 million hectares in 1952 to an estimated 95.6 million in 1990. Cultivated land is defined as that area farmers plow up each year to plant crops. New factories, roads, airfields, dams, and houses used up more land than was replaced by reclamation projects. This construction trend will continue so that by the year 2000 China's farmers likely will cultivate only 94.2 million hectares.

China's population rose from 574 million in 1952 to an estimated 1.11 billion in 1990. The combination of more people

and less land prompted farmers to use available area more intensely, such as intercropping and planting two or more crops on the same piece of land during one cropping year. This practice means total sown area in a year exceeds the cultivated area. For example, because farmers in south China can plant two to three rice crops on the same paddy fields sown area is about 1.5 times as much as cultivated land. Sown area increased from 141.3 million hectares in 1952 to 144 million in 1990 and will likely be maintained at that level through 2000.

Data Sources

In 1980, the State Statistical Bureau (SSB) and the Ministry of Agriculture (Min Ag) began publishing selected sown area data (1, 2, and 5), usually in units of 10,000 mu (15 mu equals 1 hectare). But data for many crops from 1949 to the late 1970's were not available. In 1989, Min Ag published *The Encyclopedia of China's Rural Economic Statistics* which includes sown area data from 1952 through 1986 (5) and provides the most comprehensive picture of crop area ever made available to researchers outside of China.

Government authorities published three categories of sown area data. Grain area included: rice, wheat, tubers, corn, sorghum, millet, soybeans, and other miscellaneous grains. Economic crop area included: cotton, oilseeds (such as peanuts, rapeseed, and, sesameseed), hemp, sugar crops (sugar cane and sugarbeet), tobacco, medicinal crops, and other miscellaneous economic crops. Other

crop area included: vegetables, melons, green manure, and feed.

Yet even this data set has gaps. During the chaotic years of the Cultural Revolution (1965-75), the statistical system was disbanded and some data, for example, corn, sorghum, millet, oilseeds, hemp, and tobacco, were not published. ERS estimates have been used to fill in the missing figures. No estimates were made for forage crops from 1965 to 1972.

China's agricultural authorities initiated land use surveys in the last decade and found a pattern of underreporting. More land is sown to crops than is reported by the statistical system. This underreporting of sown and cultivated area probably does not affect the general conclusions, trends, and patterns noted in this article. More research will be required to evaluate the implication of underreported crop area for crop yields, potential crop yield increases, production, and trade.

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China's population should reach 1.28 billion by 2000, further decreasing land per person. In 1952, there were 0.188 hectares of cultivated land and 0.246 hectares of sown area per person. By 1990, the figures were 0.086 and 0.129.

On the average, each citizen is supported by 860 square meters (there are 10,000 square meters in a hectare) of cultivated land which is roughly equivalent in area to two basketball courts. By comparison, each citizen in the United States is supported by 7,350 square meters of cropland, 8 times more than citizens in China (fig. D-1).

An Overview of China's Cropland

A Review of Four Decades of Farming

From 1952 to 1990 cultivated land in China fell by nearly 12 percent. To compensate, farmers used their land more intensively. Sown area increased 2.1 percent. It averaged 146.2 million hectares (fig. D-2), ranging between 159.2 million in 1956 and 139.8 million in 1968.

China's agricultural officials use the "multiple cropping index" (MCI) to measure the intensity of land use. Total sown area is divided by the quantity of cultivated land and is expressed as a percentage (fig. D-3). For example, the 1958 MCI was 141. It fell to 133 percent during the Great Leap Forward period (1958-62) when communes were organized and farm resources were misallocated. But since the mid-1960's there has been an upward trend in the MCI and in 1990 it was 151 percent.

Area sown to grain, economic, and other crops shifted in the past four decades. Grain crops fell from 124 million hectares in 1952 to roughly 111 million in 1990, an annual average decrease of 2.1 percent. In 1952, farmers planted 12.5 million hectares to economic crops, and by 1990 had increased this by 69 percent to 21.1 million hectares. Farmers planted 4.8 million hectares to other crops in 1952 and 11.6 million in 1990, an increase of 142 percent (fig. D-2 and D-4).

Forces Underlying Crop Area Changes

Three basic forces prompted China's farmers to alter cropping patterns in the past four decades: considerations of self preservation, state orders, and market forces. More research will have to be done to pinpoint which forces were paramount in producing changes for a given crop for a single year. At present, only the broad outlines of the forces can be described.

Self-sufficiency has always been an important force in China's agricultural economy. Some self-sufficiency is dictated by poor infrastructure. If an isolated farm family or a village needs edible cooking oil, oilseeds must be grown locally. Government policy at times in the past 40 years encouraged administrative units such as communes, coun-

ties, prefectures, and provinces to be self-sufficient. For example, in 1960 more than 90 percent of the food consumed in rural areas came from goods they produced themselves. But by 1982 this percentage had declined to 62 percent (2).

Figure D-1
Per Capita Cultivated and Sown Area

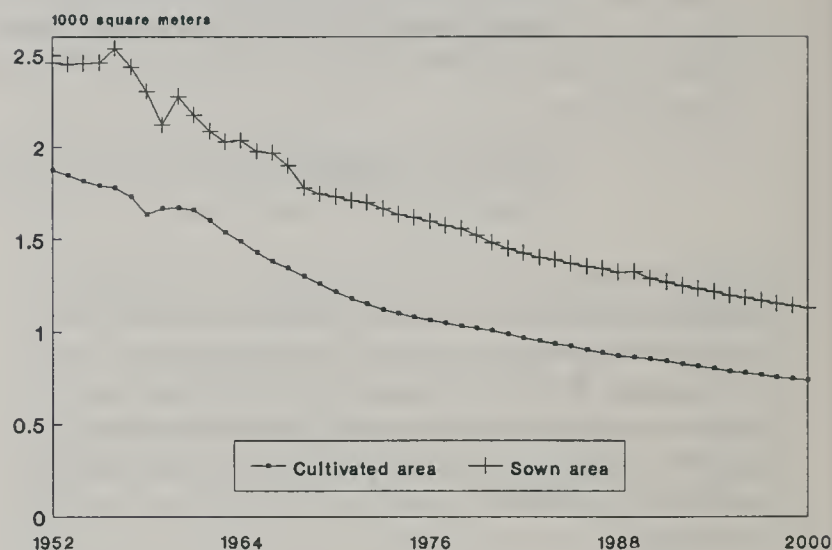
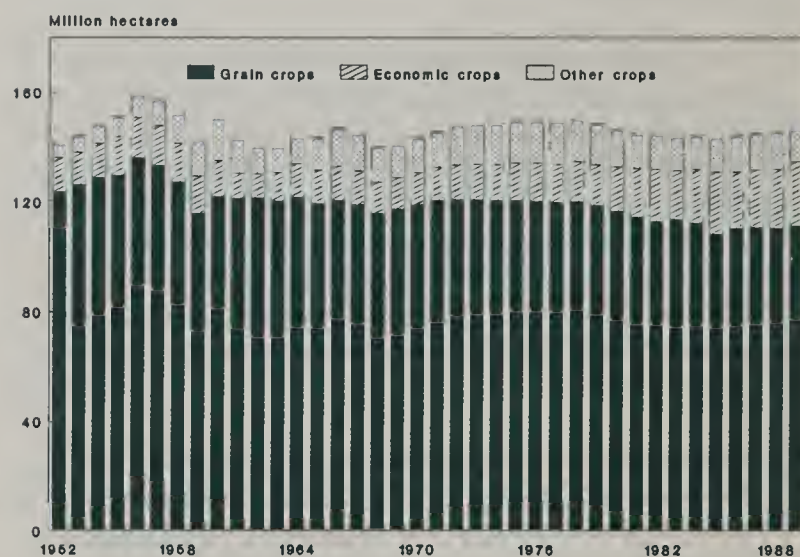


Figure D-2
Sown Area



At various times in the past four decades, farmers and production units, such as teams, brigades, and communes planted crops according to orders issued by government cadres following state plans. The commune and collective farm system from 1956 to 1984 provided an administrative framework within which cadres implemented centrally formulated crop sowing plans. The current household production contract system which links households with economic cooperatives provides a similar administrative framework in which government authorities order farmers to raise certain crops. For example, in 1990 government authorities emphasized grain production and local cadres used administrative measures to press farmers to increase the area sown to grain crops.

Farmers and production units use costs, prices, and profit margins to decide what crops to plant. Since rural reforms were initiated in 1979, prices have had an increasing role in determining the mix of crops farmers plant. Several different kinds of prices guide decisions. Government officials set procurement prices for grain, cotton, and edible oilseeds. Once farmers meet state purchase contracts, they can sell the remainder of the grain and oilseeds in local open markets. For commodities such as vegetables, prices are determined by these markets.

Outlook to 2000

A View of Specialists in China

In the mid-1980's, more than 400 of China's foremost agricultural specialists worked for several years to project a picture of China's agricultural economy for the year 2000 (6). These scientists warned that severe land use restrictions needed to be implemented to keep the annual loss of arable land under 333,000 hectares. They estimated that the total loss by the year 2000 of 6.7 million hectares would be very difficult to offset through land reclamation.

Specialists from the Grain and Economic Crop Development Team from China's Academy of Agricultural Sciences outlined three *crop sown area* scenarios for 2000 (hereafter referred to as 2000 A, 2000 B, and 2000 C). The forecasts for area sown to grain, economic, and other crops for each of the 3 scenarios are given in Table D-1. Scenario forecasts

Figure D-3
Multiple Cropping Index

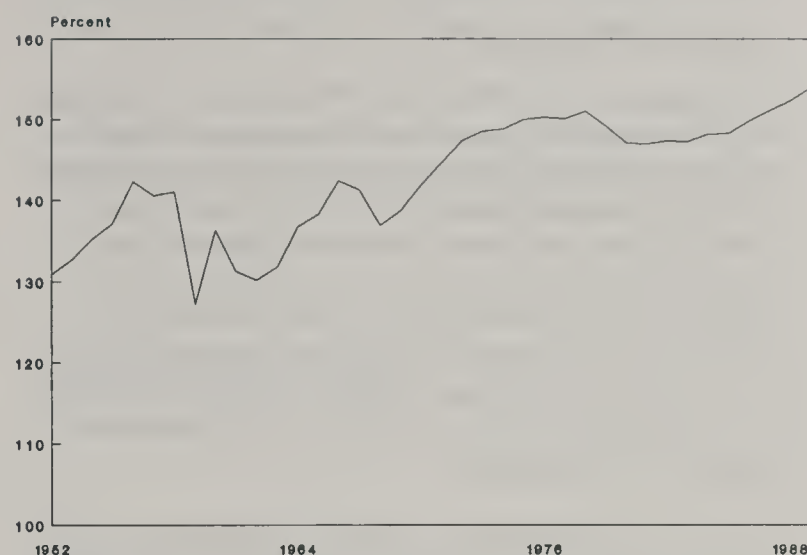


Figure D-4
Sown Area by Percent of Total

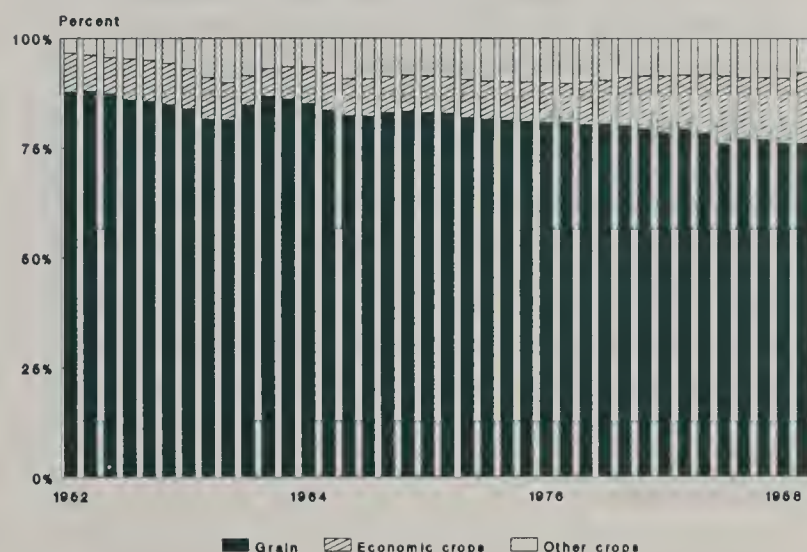


Table D-1--Forecasts for area sown to grain, economic, and other crops, 5 scenarios by China's Specialists

Scenario	Grain crops	Economic crops	Other crops	Total
million hectares				
1990 A	114.0	21.6	15.9	151.5
1990 B	112.0	19.9	14.5	146.4
2000 A	114.0	23.4	16.3	153.7
2000 B	114.0	21.5	15.9	151.4
2000 C	109.3	18.6	15.3	143.2

Source: (6).

for area sown to specific crops such as wheat and peanuts will be discussed in the sections for individual crops.

A View by USDA Specialists

ERS analysts assume that general economic growth will take more land out of cultivation than can be replaced through reclamation projects. Cultivated land will decrease by about 200,000 hectares per year in the early 1990's but investments being made now likely will begin to add new land after 1992 so that the net decrease will moderate steadily to 100,000 hectares in 2000. Cultivated land will decrease from 95.6 million hectares in 1990 to 94.2 million in 2000 (8). This means that with an expected population of 1.28 billion by 2000 each citizen will be supported by only 0.074 hectares of cultivated land.

ERS analysts estimate that the multiple crop index will rise from 151 in 1990 to 153 in 2000 and sown area will hold stable at around 144 million hectares. But because of the increase in population, sown area per capita will fall 12 percent from 0.129 hectares to 0.113 by 2000. Calculations of MCI by China and ERS vary because of different assumptions about the quantity of cultivated land by the year 2000 (the denominator) and different assumptions about the amount of sown area (the numerator).

Grain Area

From 1952 to 1990, grain crops declined from 124 million hectares to about 113 million. Area sown to grain crops as a percent of total sown area decreased from 87.8 percent in 1952 to 77.3 percent in 1990. In the 1980's, significant shifts in grain area occurred because consumers demanded more fine grains such as wheat and rice and less coarse. ERS analysts forecast area sown to grain crops will decrease to 109.2 million hectares by the year 2000, 75.6 percent of total sown area.

Sown area trends and forecasts for specific grains by PRC specialists and by ERS analysts are summarized below

(table D-2). Wheat area rose from 24.8 million hectares in 1952 to an estimated 30.3 million in 1990. Population increases, rising per capita incomes, and shifts in consumer preferences for wheat products prompted farmers to allocate more area to wheat, a trend likely to continue to 2000 (fig. D-5).

Area sown to rice rose from 28.4 million in 1952 to 32.3 million in 1990. The increases for wheat and rice are significant given the decrease in cultivated area and the drop in area allocated to grain crops (fig. D-2). Both ERS and Team forecasters estimated that by 2000 farmers would plant less rice area (fig. D-5).

Figure D-5
Wheat and Rice Area

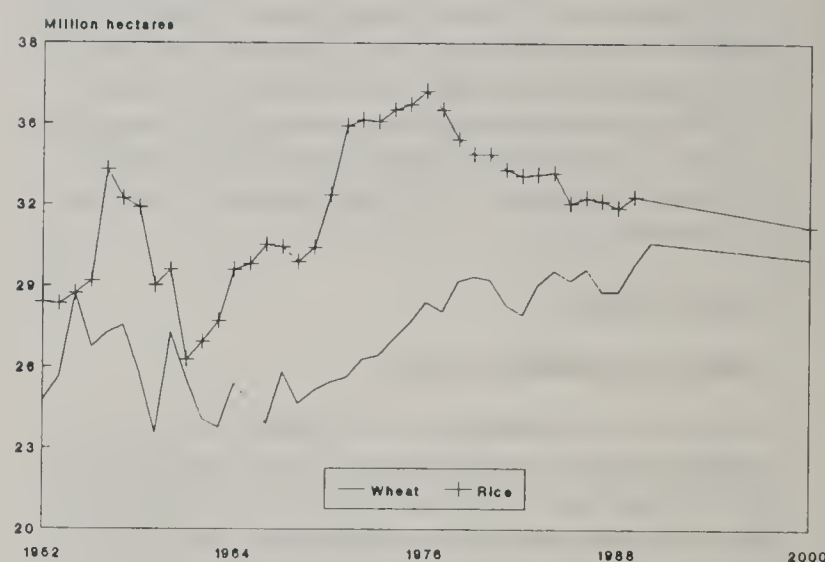


Table D-2--Percentage of area sown to grain, economic and other crops, selected years

	1952	1962	1972	1982	Forecasts for 1990			Forecasts for 2000			
					USDA	PRC A	PRC B	USDA	PRC A	PRC B	PRC C
	1990	1990	1990	1990	2000	2000	2000	2000	2000	2000	2000
Grain	87.8	86.7	81.9	78.4	77.2	75.3	76.5	75.6	74.2	75.3	76.3
Economic	8.8	6.2	8.5	13.0	14.7	14.3	13.6	16.3	15.2	14.2	13.0
Other	3.4	7.0	9.6	8.6	8.1	10.4	9.9	8.1	10.6	10.5	10.7
Total	100	99.9	100	100	100	100	100	100	100	100	100

Sources: (6) and (8).

Coarse grain area, which includes corn, sorghum, millet, barley, and oats, decreased from 40.9 million hectares in 1952 to 28.7 million in 1990 (fig. D-6). ERS analysts estimate that area likely will decrease steadily to 2000.

Corn, on the other hand, expanded from 12.7 million hectares in 1952 to 20.5 million in 1990 because the demand increased as incomes rose and residents wanted more animal food products. Farmers found that raising corn was profitable because it responded well to increased irrigation, fertilizer, and hybrid seed. China's analysts forecasted corn area would rise to 20 million by 2000. However, ERS specialists forecast a decrease to 18.6 million hectares, primarily because of less cultivated area and because government leaders stress the production of fine food grains and allocate fewer resources for corn (fig. D-6).

Sorghum area fell from 9.3 million hectares in 1952 to 1.8 million in 1990 (2, 3, and 5). In 1985, China's analysts forecasted that 2000 sorghum area would be maintained at 2.7 million hectares. ERS specialists assume that decreasing cultivated area and reduced demand for sorghum will drop sorghum area to 1.6 million hectares by 2000 (fig. D-7).

Millet area decreased from 9.8 million hectares in 1952 to 2.5 million in 1990. China reported a forecast of a 3.3-million hectare crop for 2000. ERS specialists assume that area sown to millet area by 2000 will decrease to 2.0 million hectares because of low profit margins for the crop and falling cultivated land (fig. D-7).

Soybean area decreased from 11.7 million hectares in 1952 to 8.0 million in 1990. Government officials realize the importance of soybean production in China's food and feed system, but low unit yields and relatively low prices prompted farmers to reduce area (fig. D-8). Both China and

ERS specialists forecasted that domestic demand for soybean products would prompt farmers to expand area to around 10 million hectares by 2000.

Tuber area rose rapidly from 8.6 million hectares in 1952 to 15.3 million hectares in 1958. But area stabilized at 10 million to 12 million hectares from 1959 to 1980. Area decreased slightly to a low of 8.5 million hectares when

Figure D-7
Sorghum and Millet Area



Figure D-8
Soybean and Tuber Area

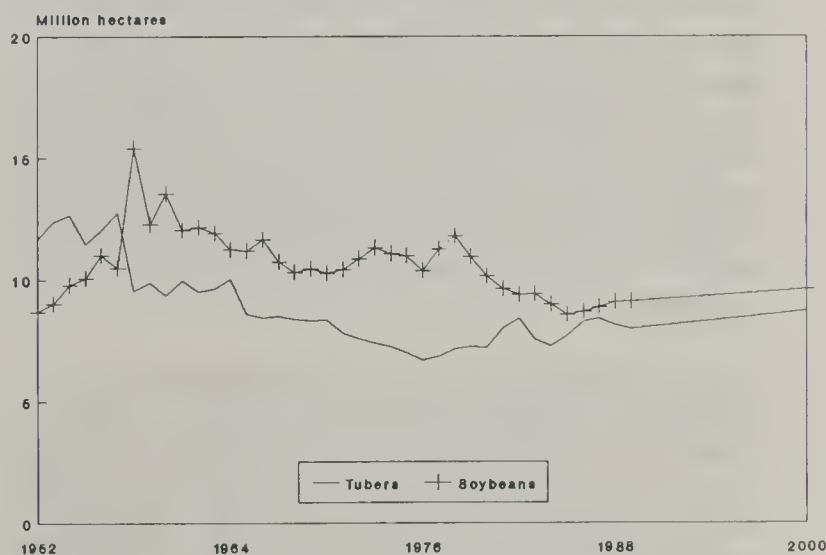
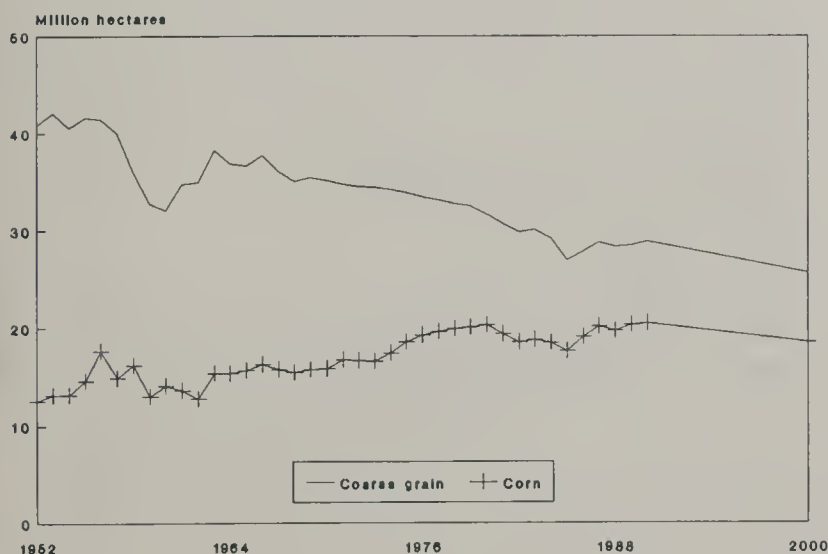


Figure D-6
Coarse Grain and Corn Area



reforms were initiated in the 1980's but by 1990 had increased to 9.1 million. Since 1979, consumers have eaten fewer potatoes directly as food but demand for feed and industrial uses remained strong which encouraged farmers to keep planting. Both China and ERS analysts assumed that domestic demand considerations would encourage farmers to plant from 7 million to 9 million hectares (fig. D-8).

Economic Crop Area

Area sown to economic crops increased from 12.5 million hectares in 1952, 8.8 percent of total sown area, to 20.8 million in 1990, 14.2 percent. ERS forecasts a rise to 23.5 million hectares by 2000, 16.2 percent of total sown area.

Cotton area increased from 1.3 million hectares in 1952 to 5.5 million in 1990, but had substantial swings over the years. Area decreased during the Great Leap Forward (1958-62) when food shortages forced farm production units to allocate more area to grain and less to cotton and oilseed crops. Area peaked at 6.3 million hectares in 1984 but surplus supplies and lower prices forced a cut in 1985-86. In the last 3 years, area expanded slightly above the long-term average of 5.1 million hectares (fig. D-9).

Both China and ERS analysts expected the area sown to cotton for 2000 would range from 5.3 to 5.7 million hectares. Population increases and demand for raw cotton to produce textiles for domestic and foreign consumption will prompt farmers to expand cotton area.

Oilseed crops, defined by China's authorities as peanut, rapeseed, sesameseed, sunflowerseed, and Huma, increased from 5.6 million hectares in 1952 to 11.8 million in 1990, an average annual increase of 1.7 percent (fig. D-9). Even with this area and yield increases, per capita edible oil availabilities for China's consumers are among the lowest in the world. In 1985, China analysts assumed area sown to oilseeds would expand to a range from 9.6 to 13.1 million in 2000. ERS specialists estimate that with population increases and rising incomes the domestic demand for edible oils will increase, encouraging farmers to plant 12.8 million in 2000.

The most rapid expansion occurred for rapeseed which rose from 1.9 million hectares in 1952 to 5.3 million in 1990. Population increases and demand for edible oil underlie this increase. The crop also fit well into the double crop rice rotation cycle. Rapeseed is grown primarily as an overwinter crop in the Yangzi River valley. Farmers plant it in the fall and harvest it in the spring from land which would otherwise be fallow (fig. D-10). ERS and China analysts assumed rapeseed area would range from 4 to 6 million hectares by 2000.

Peanut area expanded from 1.8 million in 1952 to 3.0 million in 1990, mostly after the 1979 reforms were initiated. The expansion took place at the expense of coarse grain area. China analysts estimated 2.7 to 3.0 million hectares in 2000.

ERS analysts assume rising demand for food and oil uses will put the figure at 3.6 million hectares by 2000 (fig. D-10).

Sesameseed area fell from 1.1 million hectares in 1952 to a low of 500,000 million in 1975. During the reforms, area increased to 1.1 million in 1985 because relative price changes made it a profitable crop for farmers. But profitability slipped and by 1990 the area dropped to 0.8 million hectares. Both China and ERS analysts forecasted little change in area for 2000 (fig. D-11).

Figure D-9
Oilseed and Cotton Area

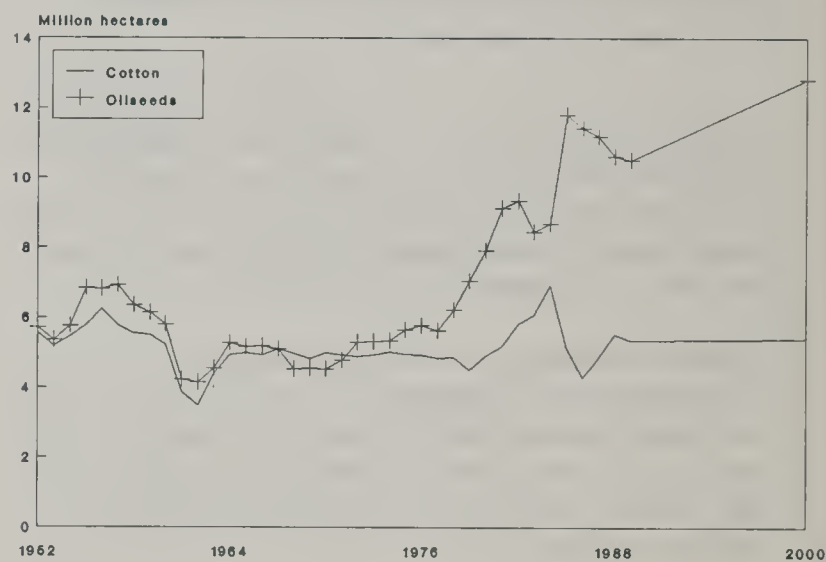


Figure D-10
Peanut and Rapeseed Area

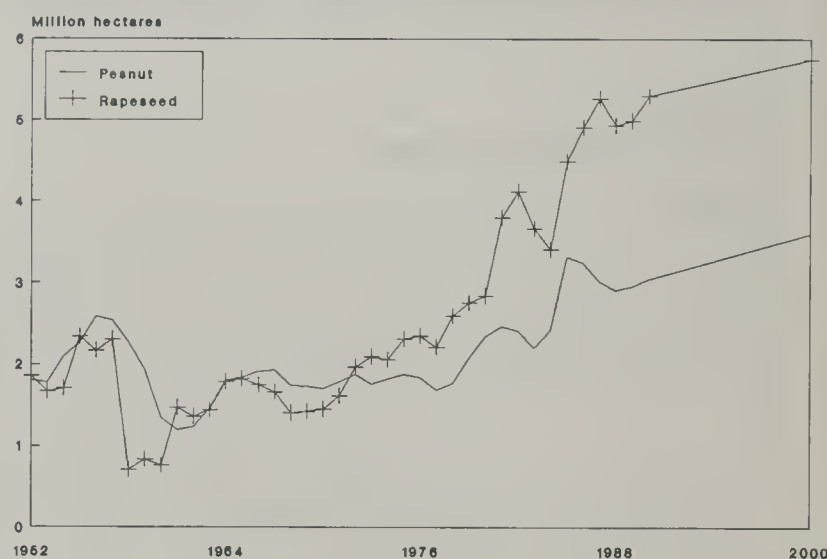


Figure D-11
Sesame, Sunflowerseed, and Huma Area

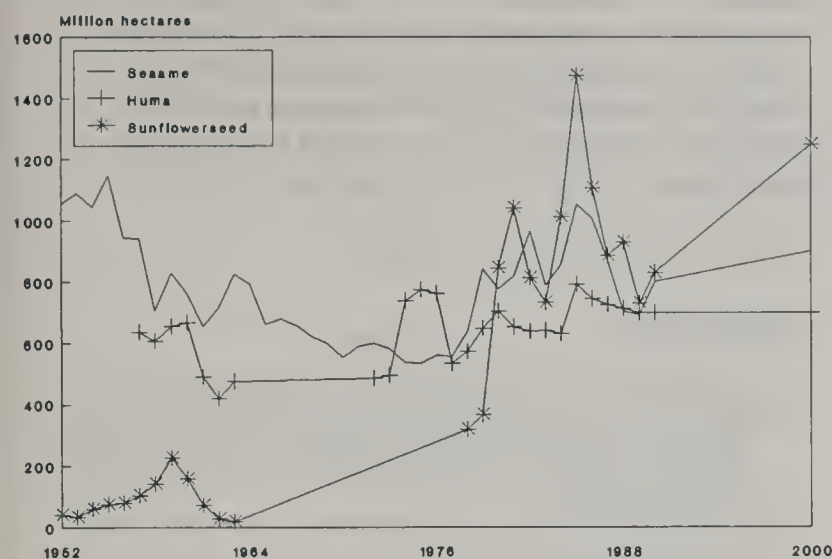


Figure D-12
Hemp and Tobacco Area

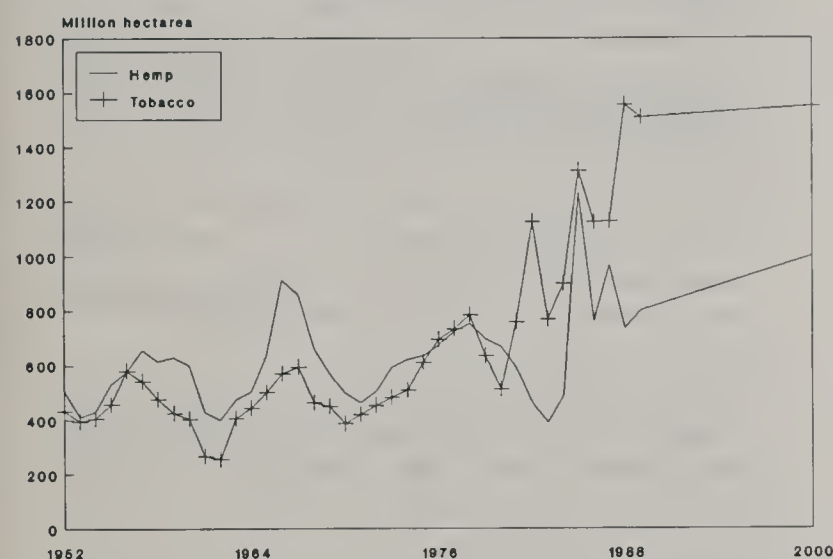
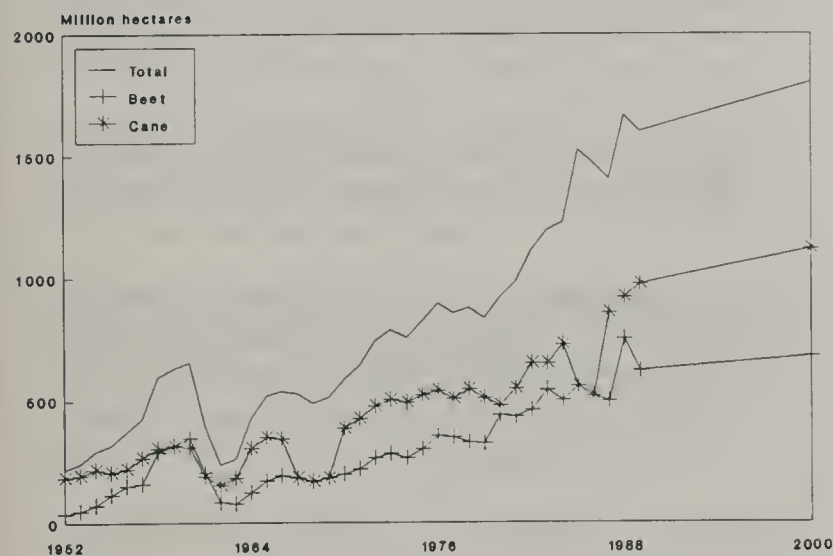


Figure D-13
Sugar Crop Area



Sunflowerseed production did not become a major crop until the mid-1970's when area started rising from 0.3 million hectares to a peak of 1.73 million in 1985. Because of disease problems area fell to an estimated 830,000 in 1990. Both China and ERS analysts estimated area sown to sunflowerseeds for 2000 would range between 1.0 and 1.7 million hectares (fig. D-11).

Hemp area averaged 611,000 hectares in the past 37 years (fig. D-12). Changes in administrative measures and relative prices underlie these fluctuations. In 1985, China analysts expected the area would range from 667,000 to 800,000 hectares by 2000. ERS analysts assume that economic growth will mean greater demand for hemp products for textile, burlap bags, and rope, and that area will increase to 1.0 million hectares by 2000.

Area sown to tobacco expanded from 433,000 hectares in 1952 to an estimated 1.5 million in 1990. When cadres pressured farm units to produce grain, such as during the Great Leap Forward and the Cultural Revolution, tobacco area fell. Generally, however, tobacco has been a profitable crop for farmers to cultivate and area rose through the years. About 80 percent of tobacco area is flue-cured (fig. D-12). Economic and administrative reforms made the crop very profitable. China analysts forecasted tobacco area would range from 573,000 hectares to 800,000 by 2000; however, ERS analysts assume that profitability will boost area to 1.5 million.

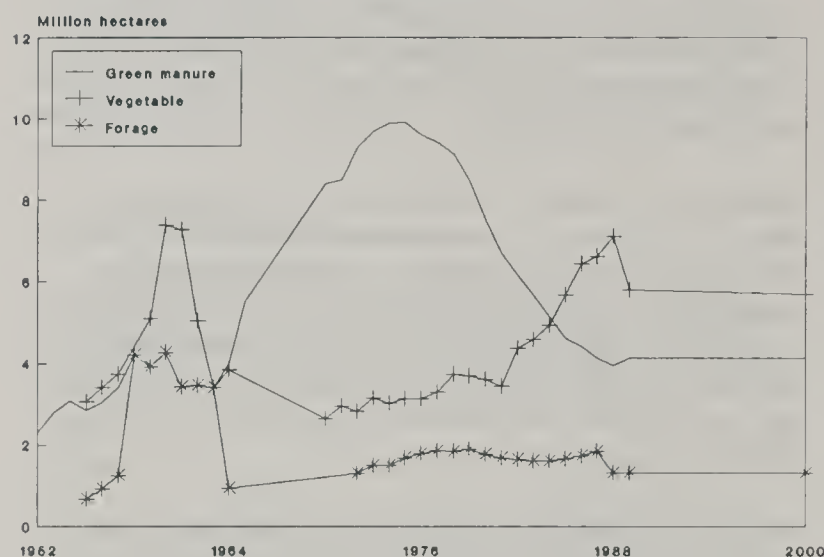
Sugar crop area expanded steadily from 218,000 hectares in 1952 to an estimated 1.57 million in 1990 (fig. D-13). China analysts forecasted sugar crop area would increase to a range from 1.5 to 2.0 million hectares by 2000.

Area sown to cane increased more than four times, from 183,000 in 1952 to an estimated 1.0 million hectares in 1990. China analysts expected area sown to sugar cane for 2000 would range from 600,000 to 800,000 hectares. ERS analysts assume that population and income increases will push farmers to raise cane area to 1.1 million hectares (fig. D-13).

Area sown to beets expanded even more rapidly, over 16 times, from 35,000 hectares in 1952 to an estimated 575,000 in 1990. China analysts forecasted that beet area would rise to a range from 867,000 hectares to 1.2 million by 2000. China analysts assumed that farmers in Northeast China (Manchuria) would be able to expand beet area because of increases in cultivated land from reclamation projects. ERS analysts assume that farmers will marginally increase beet area to 680,000 by 2000 (fig. D-13).

Medicinal crop area doubled from 72,000 hectares in 1958 to an estimated 144,000 in 1990. ERS analysts forecast farmers will continue to plant about 144,000 hectares out to the

Figure D-14
Vegetable, Forage and Green Manure Area



year 2000. Other economic crop area increased from 46,000 hectares in 1952 to 1.1 million in 1990. It is interesting to note that this expansion began in 1968, well before economic reforms were initiated in 1979.

Other Crop Area

Area sown to other crops expanded from 4.8 million hectares in 1952, 3.4 percent of total sown area, to an estimated 11.6 million in 1990, 7.9 percent of the total. ERS analysts assume that area sown to other crops will increase slightly to 11.7 million hectares by 2000, 8.1 percent of total sown area.

Vegetable and melon sown area data increased from 2.7 million hectares in 1970 to an estimated 5.9 million in 1990 (fig. D-14). In 1985, China analysts reported area would range from 3.3 to 4.0 million hectares by 2000. ERS analysts assume population increases, rising incomes, and health and nutrition considerations will prompt farmers to raise vegetable area to 6.2 million by 2000.

Forage crop area rose from 1.3 million hectares in 1972 to an estimated 1.3 million in 1990. China analysts said that forage area would range from 1.9 million to 3.2 million by 2000. The competition for scarce land resources will drive farmers to opt to plant more area to food crops and less for animal feed (fig. D-14). ERS analysts assume area sown to forage crops will be around 1.3 million hectares, considerably less than that forecasted by the Team.

Green manure crop area expanded sharply from 2.3 million hectares in 1952 to a peak of 9.9 million in 1975, and fell steadily to 4.1 million in 1990. This decline has long-term implications for soil fertility and structure. China analysts forecasted that green manure area would range from 8.3 to 10 million hectares by 2000. ERS analysts assume that green manure area will decline to around 4 million hectares (fig. D-14).

[Frederick W. Crook, 202-786-1626]

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An Overview of China's Forests

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Abstract: China has rich natural conditions to grow forests, but increasing demand for timber and wood products over many decades pushed loggers to exploit forest resources. Overcutting and undercultivation meant a declining resource base in the face of rapidly expanding demand. The Government plans to restrict consumption, promote the use of substitutes, and expand imports to ease the difference between demand and supply.

Keywords: Forest area, forest types, imports, wood demand and supply, forest policy.

China is endowed with favorable geographical and climatic conditions for forest propagation. However, unrelenting overcutting and undercultivation have caused a severe crisis in forest resources, including extraordinary timber shortages and environmental destruction. Several steps have been taken, including rigid control over timber consumption, wood substitution, forest products importation, and expansion of afforestation, to cope with the situation. Because of the long production period for trees and current policy constraints, it seems unrealistic to expect the situation will improve soon. On the other hand, as population pressure and economic development proceed, timber demand will continue to increase rapidly. As a result, it will be necessary to maintain increased log and manufactured wood product imports.

Forest Resources

In China, there are 261 million hectares suitable for forestry. These include 102 million hectares of closed forests in which trees are so close together that their crowns form a continuous canopy. Closed forests have a volume of 8,091 million cubic meters of wood (table E-1). In addition, there are 17 million hectares of bamboo stands and cash tree crops such as fruit, oilseed and rubber, 20 million hectares designated as understocked open-canopy woodlands, or open forests, and 28 million hectares as shrub lands. The balance is either used as nurseries or area targeted to be afforested. Total forest resources in China contain an inventory of 9,523 million cubic meters.

Artificially established forests, also known as plantation forests, total 31 million hectares and account for 26 percent of forested area in China. Table E-2 summarizes plantation forest data by functional forest types.

The closed forests are grouped into four categories according to type of use: timber production, environmental protection, firewood production, and special use such as national security and scientific experiments. Closed forests are also divided between softwood and hardwood based on their

major tree species. Softwood occupies 51 million hectares and accounts for 55 percent of volume or 4,441 million cubic meters. Hardwood also occupies 51 million hectares but only represents 45 percent of volume or 3,650 million cubic meters.

China has four different forest districts: Northeast, including Heilongjiang, Jilin and the eastern part of Inner Mongolia; Southwest, including Sichuan, Yunnan and Tibet; South, consisting of Zhejiang, Fujian, Anhui, Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Guizhou and Hainan; and North Central, covering Beijing, Tianjin, Hebei, Shanxi, Henan, Liaoning, Shanghai, Jiangsu, Shandong, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang. However, on the basis of geography, ownership patterns, and forest characteristics, the Government groups the various districts into three forest resource management regions: the Northeast/Southwest National Forest Region; the Southern Collectively Owned Forest Region; and the Central/Northern/Northwest Farm Forest Region.

Half of the forested area is located in the Northeast/Southwest National Forest Region (table E-3), and mostly owned and operated by the Central Government. More than 130 forest bureaus are in this region to oversee protection, management, and harvesting.

There are 10 provinces in the Southern Collectively Owned Forest Region where fairly good natural conditions exist for forest growth and forest cover is fairly high. This region is China's second major wood basket. Because south China has been densely populated for several millennia, there are almost no virgin stands left. Most of the forests are second, third, or much younger generations from either natural regeneration or artificial establishment. During the mid-1950's, forests and groves in the Southern Region came under collective ownership as individual farmers joined collectives and communes.

There are 15 provinces and autonomous regions in the Central/Northern/Northwest Farm Forest Region. This region has only a few small patches of forests and woodlands located in largely inaccessible places as the result of unfavor-

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Table E-1. China's Closed Forests

Forest	Forested area (million ha.)	volume (million cbm)
Timber production forests	80.07	6173.17
Environmental protection forests	14.56	1399.62
Firewood production forests	4.44	65.62
Special-use forests	3.12	453.08
Total	102.19	8091.49

Source: (7)

Table E-2 China's Closed Forest Plantations

Type of forest	Area million ha.	Percentage of total %	Volume million cbm	Percentage of total %
Timber production forest	14.76	78.75	423.73	79.97
Environmental forest	3.10	16.55	96.61	18.23
Firewood production forest	0.73	3.90	2.97	0.56
Special-use forest	0.15	0.79	6.55	1.24
Total	18.74	100.00	529.85	100.00

Source: (6).

Table E-3 China's Forest Distribution

Region	Forested area	Percent of total	Timber Inventory volume	Percent of total %
Northeast	35.68	29.87	2892.00	35.74
Southwest	23.31	19.51	2948.00	36.44
South	41.08	34.39	1337.00	16.52
Other	19.40	16.24	914.00	11.30
total	119.47	100.00%	8091.00	100.00%

Source: (7).

Table E-4. China's Wood Products Imports

Year	Plywood CBM	Pulp Ton	Paper Ton	Timber CBM
1982	455835	520279	530036	4859099
1983	456882	780821	646482	6497428
1984	528815	618689	681586	8238388
1985	722145	530468	808037	10736829
1986	370290	576344	1218384	7755336
1987	882367	778916	1256914	7643011
1988	948775	1113970	1126480	10114513
total	4365109	4919487	6267919	55844604

Source: (6).

Note: (1) paper includes all processed paper products as well as crude paper; roundwood includes lumber and sawlogs converted.

able natural conditions and long-term exploitation of more accessible areas. The forest cover is so low that it is inadequate to protect the environment, and provides little commercial timber. Even though farmland forest networks, "4-side" plantings (e.g., beside houses, villages, roads, and waterways), agro-forest, and shelterbelts have been widely established in the past two decades, this region remains largely deficient of forest resources.

In China, about 64 million hectares of forest are collectively owned. China's state-owned forests amount to 53 million hectares or 45 percent of the total area. State-owned forests, carrying a standing timber inventory of 5,294 million cubic meters, constitute 70 percent of the inventory volume of closed forests, while the collectively-owned share accounts for 2,219 million cubic meters or 30 percent of the total. After 1949, forests could not be owned by individuals. Since reforms were initiated in rural areas in the early 1980's, farmers have been permitted and even encouraged to participate in tree planting on their rented lands. However, it is still too early to evaluate the magnitude of this activity. Consequently, data measuring private forest activity have not been separated from the data for collectively owned forests.

Declining Timber Inventory

From 1980 to 1988, broad forest area was increased 3.9 million hectares through massive afforestation efforts. Nevertheless, timber inventory declined in this period. The estimated mean annual increase was 365 million cubic meters. The annual volume lost to mortality was 36 million cubic meters, leaving a net annual growth of 329 million cubic meters. The yearly harvest, however, averaged 345 million cubic meters.

The situation is far worse when viewed from the perspective of timber production forests. Timber production forests fell by 2.9 million hectares between 1980 and 1988. About 350,000 hectares were cleared annually, cutting the inventory 96.1 million cubic meters each year. The most drastic reductions were in the mature and overmature portion of natural production forests. The remainder of these natural forests will be completely cut in less than 10 years if the current harvest rate continues. Timber inventories may continue to decline until the turn of the century even if forceful countermeasures are adopted immediately (2, and 8).

Although almost 18 percent of closed forests are artificially established stands, probably the highest total acreage in the world, the low volume per hectare and diffuse location will keep them from playing a significant role in timber production in the coming decades. It may be that these two problems are more damaging to timber production than the gradual decrease of old growth stands (8).

Rising Timber Demand

Analysts believe that China's wood demand has grown and will continue to grow rapidly in response to the heavy pressures of population increase and economic development. By the end of this century, annual consumption may reach 450-500 million cubic meters (2, and 8). The country will face severe timber shortages and environmental deterioration.

Annual roundwood consumption in China is currently around 65 million cubic meters. With a roundwood recovery rate of approximately 65 percent, the annual harvest plan requires utilizing timber resources of roughly 100 million cubic meters. Another 200 million or more cubic meters of timber go for firewood, house construction, furniture, and other requirements of the rural population.

Wood and Wood Product Imports

In 1979, the central government decided to expand timber and manufactured wood product imports to lessen the pressure on domestic resources (table E-4). Imports of plywood, pulp, paper, and logs more than doubled in the 1980's. Converting each category to roundwood equivalent gives an estimated total of 15 million cubic meters, exceeding 25 percent of annual planned production. Were it not for constraints on foreign exchange, import volumes would have been even higher.

China's papermaking industry has long suffered from wood pulp shortages. Only about one-quarter of the total pulp volume came from wood, with the rest from straw, bamboo, and other sources (3). Increased pulp, paper, and paper board imports have improved the supply of high-grade newsprint, print paper, packing paper board, and other products (table E-4).

In 1988, China imported 10 million cubic meters of sawlogs and timber from more than 20 countries and regions. Over 90 percent of the imports were softwoods, with most coming from the U.S. Pacific Northwest and the USSR Far East. In 1986, imports from these two countries accounted for 45.4 percent and 38.4 percent of the total. Canada and Malaysia shared 4 percent each, and the other 8.2 percent was attributed to all other countries and regions. The imports of hardwood are mainly tropical species, primarily from Indonesia and Malaysia, for the production of plywood and fishing boats.

Pulp and paper are primarily imported from North America. Plyboard imports, however, are mostly from Indonesia. In 1986, Indonesia exported 350,000 tons of plyboard to China for a market share of 87.5 percent (4).

Most imported wood arrives at several of China's ports, with major timber and wood handling facilities at Shanghai, Lianyungang, Qinhuangdao, and Dalian. However, China

lacks the modern docks and timber handling facilities to handle large volumes of wood imports. Therefore, large amounts of foreign exchange are used to import, transport, and handle the timber and timber products.

The imports of wood and manufactured products are controlled through the central planning system. Physical and monetary quotas for imports are decided by the Central Planning Commission. Commercial transactions are handled by an official state trading corporation which manages international transactions for native products, forestry, and livestock byproducts. The China Wood Corporation, another state-owned enterprise, is responsible for delivery and distribution.

Yearly imported pulp paper and paper board volumes under the state-plan are each around 500,000 tons, while sawlog and timber imports total about 5 million cubic meters. Statistics show that outside state-plan imports have grown from almost nothing to slightly over half of total pulp and timber imports (table E-4). The important difference determining whether imports fall inside or outside the planning system depends not on the varying channels and quantities but on dissimilar price formulations and subsidies.

The planned prices of the imported products are equal or a little higher than the prices of domestic products. Since government retail prices of forestry products in China are much lower than either domestic or international market prices, users covered by government plans can purchase the products at subsidized prices. By fixing state retail prices, the Central Government must allocate at least one billion yuan annually to cover the use of imported wood and manufactured products. This amount is almost equal to the total government investment in forestry between 1986 and 1990 (8). In general, imports that are outside the state-plan are costly, with prices often more than double those of comparable domestic products. Consequently, the distorted pricing systems have become a crucial problem.

As relations thawed in the early 1980's, the nature of China's and the USSR's economies and natural resource endowments prompted the development of Chinese exports of agricultural and light-industry goods and imports of timber and other products. In 1983, China resumed importing wood products from the USSR and since then barter trade along the long border has continued to increase. Because barter trade does not necessarily involve foreign exchange and wood from the USSR Far East is relatively inexpensive, China hopes that the majority of future increases in wood imports will come from that region.

However, as imports from the USSR continue to rise, timber hauling capacity has become a constraint. Freight trains hauling timber from the USSR Far East pass through China's Northeast region. Limits on China's track, cars, and engines constrain the ability of the rail system to transport both

domestic and imported forestry products. Recently, there has been an initiative to transport imported wood products from the USSR by ship.

Although imports of forest products have played an important role in overcoming the scarcity of timber production, problems remain. Prices of timber and sawlogs have remained relatively stable, but prices of pulp, paper and paper board have soared in recent years. In the first quarter of 1989, for instance, prices (fob) of imported newsprint, pulp, and paper reached \$750 to \$800 per metric ton, compared with less than \$400 in the early 1980's. This implies a need for more foreign exchange and increased budget revenues for subsidies.

Furthermore, the import policy involves a high opportunity cost as well as discrimination against the development of domestic forests because domestic prices are so much lower than those in international markets. Planned domestic prices of roundwood, wood pulp, and paper are about 150 yuan/cubic meter (less than \$50) and 1500 to 1800 yuan/ton (\$400 to \$500) respectively. The international prices for these same products are \$100/cubic meter and \$700 to \$750/ton respectively.

A Problematic Future

The many problems with forestry, including declining domestic resources as well as financial and infrastructure constraints on imports will likely see little improvement in the short term. Nevertheless, over the next two decades China's imports of forest products will necessarily increase.

The development of the paper-making industry will force China to increase imports. In general, paper production should keep pace with GNP increases, that is, 6 to 7 percent annually. Assuming that half of the fiber consumption is provided from wood sources, an additional 15 million cubic meters of wood must be supplied by the turn of the century. Another problem is that areas in the southeast have witnessed more than a 10-percent annual growth rate in demand for forestry products because of house construction and maintenance. Without imports of forestry products, it will be impossible to meet the increasing social demands for wood products.

A possible solution, however, can be found in forestry management research. With great potential for enhancing timber productivity, it could very well ease the wood shortage and help build a solid foundation for environmental protection. If 10 million hectares of intensively managed forest plantations could be established in the next 20 years, which only accounts for 1 percent of the total land area of the country and less than 4 percent of the area available to forestry, then 100 million cubic meters of wood could be produced each year (9). In fact, with financial aid from the World Bank, a huge project has already been put into motion. The project

is aimed at setting up forest plantations with fast growing species and improving 6.6 million hectares of existing stands by the end of the century. To realize these objectives, however, many researchers suggest China must also make essential reforms in the outdated industrial organization, institutional arrangement, pricing, investment, and taxation policies that have a negative impact on the timber industry.

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Conversion Equivalents and Definitions

China	Metric	English	
1 mu	0.0667 ha	0.1647 acre	
15 mu	1.0 ha	2.4711 acre	
1 jin (catty)	0.5 kg =	.0005 ton	1.1023 lbs
1 dan (100 jin)	50.0 kg =	.05 ton	110.23 lbs
1 dun (ton)	1,000.0 kg =	1.00 ton	2,204.6 lbs
1 jin/mu	7.5 kg/ha	6.93 lbs./acre	
Crops:	Lbs./bu.	1.0 bu.	1.0 ton
Wheat, potatoes, soybeans	60	0.02722 ton	36.743 bushels
Rye, corn, and sorghum	56	0.02540 ton	39.368 bushels
Barley	48	0.02177 ton	45.929 bushels
Oats	32	0.01452 ton	68.894 bushels
Cotton (480-lb bale)	NA	NA	4.593 bales
Cotton (500-lb running bale)	NA	NA	1.409 bales

Appendix table 1--China's grain area, yield, and production, 1985-89 1/

Unit	1985	1986	1987	1988	1989 1/
Million hectares					
Sown area					
Wheat	29.22	29.62	28.81	28.79	29.84
Rice	32.07	32.27	32.14	31.91	32.70
Coarse grains	26.99	27.91	28.73	28.25	28.50
Corn	17.69	19.12	20.19	19.69	20.35
Sorghum	1.94	1.88	1.86	1.79	1.82
Millet	3.32	2.98	2.69	2.51	2.50
Barley	3.45	3.36	3.40	3.28	3.28
Oats	0.59	0.57	0.58	0.56	0.55
Potatoes	8.72	8.69	8.85	9.07	9.10
Others 2/	11.99	12.45	12.69	12.38	11.90
Total 3/	108.85	110.93	111.22	109.91	112.21
Tons/hectare					
Yield 4/					
Wheat	2.94	3.04	2.98	3.00	3.05
Rice	5.27	5.34	5.41	5.30	5.54
Coarse grains	3.05	3.12	3.33	3.33	3.32
Corn	3.61	3.71	3.92	3.93	3.88
Sorghum	2.90	2.87	2.93	2.96	2.94
Millet	1.80	1.52	1.86	1.81	1.62
Barley	1.81	1.68	1.78	1.67	1.74
Oats	1.12	1.04	1.18	1.19	1.26
Potatoes	2.98	3.10	3.15	2.97	3.10
Others 2/	1.36	1.36	1.44	1.24	1.43
Total 3/	3.48	3.53	3.62	3.59	3.63
Million tons					
Production					
Wheat	85.81	90.04	85.84	85.43	90.80
Rice	168.57	172.22	173.88	169.11	180.13
Coarse grains	82.33	87.01	95.80	94.21	94.64
Corn	63.83	70.86	79.15	77.35	78.93
Sorghum	5.61	5.38	5.43	5.59	5.35
Millet	5.98	4.54	4.54	4.41	4.04
Barley	6.24	5.63	6.04	6.18	5.69
Oats	0.66	0.60	0.64	0.67	0.63
Potatoes 5/	26.04	25.34	28.13	26.97	27.30
Others 2/	16.37	16.90	18.30	15.41	17.05
Total 3/	379.11	391.51	402.04	394.08	407.55

1/ Data are official figures released by the SSB or the Ministry of Agriculture, except for:
 (1) 1989 total and individual coarse grain production; and (2) 1985-89 barley and oats, and other grain area and production.

2/ Consists of soybeans, pulses, and other miscellaneous grains. All of these items are included in China's definition of total grains.

3/ PRC definition.

4/ Calculated from area and production figures.

5/ Converted to a grain-equivalent weight using a 5:1 conversion ratio.

Sources: China Agricultural Yearbooks, 1985-89; China Statistical Yearbooks, 1985-89; and the 1989 SSB Communiqué.

Appendix table 2--China's 1989 provincial grain, cotton, oilseed, sugar crop, and red meat production

Province	Grain	Cotton	Oilseed	Sugar crop	Red meat
			1,000 tons		
Northeast:					
Heilongjiang	16215	0	131	3975	332
Liaoning	9440	8	71	234	720
Jilin	13513	0	348	660	384
North:					
Shandong	30647	1025	1500	30	1727
Hebei	20686	536	560	44	1120
Beijing	2392	3	28	0	171
Tianjin	1698	11	44	0	91
Henan	31494	527	1185	116	1112
Shanxi	8791	102	298	340	231
Northwest:					
Shaanxi	10493	56	311	53	402
Gansu	6445	5	304	663	342
Nei Monggol	6918	0	531	1722	489
Ningxia	1746	0	62	460	58
Xinjiang	6201	295	323	989	245
Qinghai	1108	0	106	7	142
East:					
Zhejiang	15447	42	383	701	824
Jiangsu	32578	485	999	258	1512
Shanghai	2325	8	151	14	205
Anhui	23835	170	1017	90	904
Central:					
Hubei	23704	313	767	396	1317
Hunan	26482	67	602	1421	1805
Jiangxi	15629	50	376	1495	958
South:					
Guangdong	18270	0	563	17528	1351
Guangxi	12708	0	230	12542	795
Fujian	8846	0	162	3387	603
Hainan	1518	0	45	2869	116
Southwest:					
Sichuan	40785	85	1406	2314	3844
Guizhou	7083	0	329	212	690
Yunnan	10002	0	103	5518	682
Xizang	550	0	17	0	90
Total	407549	3788	12952	58038	23262

Source: Statistical Summary, 1990; and Statistical Yearbook, 1989.

Appendix table 3--China's oilseeds and cotton area, yield, and production, 1985-89

Item	1985	1986	1987	1988	1989 1/
Sown area: 1,000 hectares					
Cotton	5,140	4,306	4,844	5,535	5,203
Oilseeds, USDA 2/	22,144	21,877	22,431	21,434	21,929
Soybeans	7,718	8,295	8,411	8,120	8,057
Oilseeds, PRC 3/	11,800	11,415	11,181	10,619	10,512
Peanuts	3,318	3,253	3,022	2,914	2,946
Rapeseed	4,494	4,916	5,267	4,936	4,993
Sesameseed	1,052	1,007	869	704	722
Sunflowerseed	1,474	1,107	887	830	730
Other oilseeds 4/	1,462	1,132	1,136	1,135	1,140
Yield: Kg/hectare					
Cotton	805	824	877	750	731
Oilseeds, USDA 2/	1,294	1,301	1,370	1,235	1,200
Cottonseed	1,372	1,398	1,490	1,274	1,240
Soybeans	1,362	1,400	1,482	1,434	1,270
Oilseeds, PRC 3/	1,338	1,291	1,366	1,243	1,220
Peanuts	2,008	1,808	2,042	1,954	1,793
Rapeseed	1,248	1,196	1,254	1,021	1,090
Sesameseed	657	614	605	574	592
Sunflowerseed	1,175	1,395	1,399	1,420	1,342
Other oilseeds 4/	745	718	647	781	605
Production: 1,000 tons					
Cotton 5/	4,137	3,549	4,246	4,149	3,788
Cotton (1,000 bales) 5/	19,000	16,300	19,500	19,100	18,000
Oilseeds, USDA 2/	31,562	30,939	33,698	30,615	28,450
Cottonseed	7,050	6,018	7,217	7,053	6,440
Soybeans	10,509	11,614	12,465	11,645	10,230
Oilseeds, PRC 3/	15,784	14,738	15,278	13,203	12,820
Peanuts	6,664	5,882	6,170	5,693	5,360
Rapeseed	5,607	5,881	6,605	5,040	5,440
Sesameseed	691	618	526	404	340
Sunflowerseeds	1,732	1,544	1,241	1,180	980
Other oilseeds 4/	1,090	813	735	886	690
Edible veg oil 6/	4,057	4,534	4,870	5,029	5,241
Available meal 6/	7,566	7,648	8,618	7,147	7,317

1/ Figures for sunflowerseed and other oilseeds are USDA estimates. 2/ Oilseed data published by USDA include only soybeans, cottonseed, peanuts, rapeseed, and sunflowerseed; area includes cotton. 3/ China's total oilseed data exclude soybeans and cottonseed. 4/ "Other oilseeds" are calculated as a residual and include mainly huma (an edible oil-bearing flaxseed) and castor beans; oil-bearing tree seeds are excluded. 5/ Cotton production is on a ginned-weight basis. Bales are 480 pounds. 6/ Available oil and meal are estimated by USDA for the marketing year following harvest by applying assumed crush and extraction rates to production plus net imports. Edible vegetable oil excludes linseed oil.

Source: China Statistical Yearbooks, 1986-89; China Agricultural Yearbook, 1982-89; and the 1989 SSB Communiqué.

Appendix table 4--China's yearend livestock inventories and product output, 1985-89

Item	1985	1986	1987	1988	1/ 1989
Million head					
Yearend inventory:					
Hogs	331.40	337.19	327.73	342.22	352.00
Large animals	113.82	118.96	121.91	125.38	128.00
Draft animals	66.46	69.05	71.13	72.19	73.20
Cattle	86.82	91.67	94.65	97.95	99.95
Dairy cows	1.63	1.85	2.16	2.22	2.36
Water buffalo	19.93	20.41	21.50	21.65	21.75
Horses	11.08	10.99	10.69	10.54	10.40
Mules	10.41	10.69	10.84	11.05	11.20
Donkeys	4.97	5.11	5.25	5.37	5.50
Camels	0.53	0.50	0.48	0.47	0.46
Sheep	94.21	99.01	102.65	110.57	115.75
Goats	61.67	67.22	77.69	90.96	95.25
Poultry	1,978.91	1,965.60	2,050.00	2,150.00	2275.00
Million head					
Number slaughtered:					
Hogs	238.75	257.22	261.77	275.70	289.00
Cattle	4.57	5.55	6.33	8.58	9.10
Sheep & goats	50.81	52.27	56.52	68.27	72.00
Percent					
Slaughter rate:					
Hogs	77.8	77.6	77.6	84.1	84.4
Cattle	5.6	6.4	6.9	9.1	9.3
Sheep & goats	32.1	33.5	34.0	37.9	39.9
1,000 tons					
Production:					
Meat	17,607	19,171	19,860	21,936	23,280
Pork	16,547	17,960	18,349	20,176	21,250
Beef	467	589	792	958	1,105
Mutton	593	622	719	802	925
Poultry meat	1,602	1,879	2,020	2,744	3,200
Cow's milk	2,499	2,899	3,301	3,660	3,800
Sheep & goat's milk	395	430	487	529	570
Sheep's wool	178	185	209	222	238
Mohair	11	12	13	14	15
Cashmere	3	4	4	5	5
Eggs	5,347	5,550	5,902	6,955	7,500

1/ All 1989 data are ERS estimates except for inventory of hogs, large animals, hogs slaughtered, hog slaughter rate, production of meat, cow's milk, and sheep's wool.

Source: China Agricultural Yearbooks, 1985-89; 1989 SSB Communiqué.

Appendix table 5--China's major agricultural exports by volume, 1986-89

Item	Units	1986	1987	1988	1989
Swine, live	1,000 head	3,110	3,020	3,027	2,980
Poultry, live	1,000 head	42,450	41,150	44,180	44,840
Beef, fresh or frozen	Tons	25,704	33,587	53,986	56,493
Pork, fresh or frozen	Tons	104,670	99,964	63,484	88,423
Broiler, frozen	Tons	27,971	16,769	25,660	31,465
Rabbit meat, frozen	Tons	13,975	20,545	20,976	21,438
Eggs	Million	1,063	1,109	924	606
Food grain	1,000 tons	9,420	7,080	7,180	6,570
Rice	1,000 tons	950	1,020	700	240
Corn (maize)	1,000 tons	5,640	3,920	3,920	3,500
Soybeans	1,000 tons	1,380	1,710	1,480	1,260
Fruit	Tons	223,859	243,792	280,853	252,006
Oranges	Tons	61,239	76,160	74,705	70,514
Apples	Tons	48,135	60,345	87,859	70,332
Walnuts, in shell	Tons	13,786	9,777	8,370	8,684
Walnut meat	Tons	8,212	11,294	10,608	12,845
Chestnuts	Tons	38,816	35,966	35,292	33,296
Sugar	Tons	265,475	452,493	247,802	429,623
Natural honey	Tons	80,590	66,831	46,487	71,498
Tea	Tons	172,084	174,273	198,290	198,399
Canned food	Tons	445,277	536,958	554,176	548,355
Pork	Tons	88,664	93,757	81,528	86,341
Vegetables	Tons	287,133	329,843	333,224	332,143
Fruit	Tons	47,896	87,351	87,967	71,399
Beer	Tons	28,367	32,429	39,343	41,753
Flue-cured tobacco	Tons	15,387	17,019	19,367	21,931
Goatskin	1,000 pieces	11,264	721	1,145	7,450
Fur skin, raw	1,000 pieces	3,473	844	435	3,800
Mink skin	1,000 pieces	685	270	174	2,660
Raw silk	Tons	9,394	9,234	9,404	11,361
Cotton	Tons	563,157	754,577	468,002	272,482
Cashmere	Tons	1,502	2,560	2,712	2,039
Rabbit hair	Tons	3,556	4,908	9,735	6,442
Salt	1,000 tons	1,173	808	382	n/a
Oilseeds, edible	Tons	508,319	528,938	510,215	392,080
Peanuts and shelled	Tons	262,419	267,987	251,218	266,066
peanuts	Tons	165,723	55,660	25,503	62,099
Vegetable oil	Tons	228,202	242,964	205,717	183,656
Cotton yarn	Tons				

Sources: China's Customs Statistics, 1986-89.

Appendix table 6--China's major agricultural exports by value, 1986-89

Item	1986/1	1987	1988	1989
\$1,000 U.S.				
Swine, live	196,076	201,960	232,910	242,410
Poultry, live	70,207	71,750	76,540	78,940
Beef, fresh or frozen	41,375	55,320	107,980	105,940
Pork, fresh or frozen	182,446	172,080	115,820	159,300
Broilers, frozen	38,847	25,230	43,480	55,320
Rabbit meat, frozen	26,379	40,910	37,390	34,610
Eggs	36,379	42,850	41,130	29,010
Food grain	1,310,658	1,013,560	1,189,060	1,191,630
Rice	190,897	187,160	180,980	94,470
Corn (maize)	610,858	323,190	393,480	438,810
Soybeans	295,890	367,500	380,970	365,610
Fruit	90,952	101,360	125,710	108,500
Oranges	28,438	35,850	38,300	34,620
Apples	19,595	26,340	39,410	27,110
Walnuts, in shell	13,299	9,710	8,260	8,650
Walnut meat	14,336	24,870	23,510	27,160
Chestnuts	70,369	65,030	61,420	53,950
Sugar	54,590	90,560	62,040	161,400
Natural honey	63,702	53,750	37,020	56,140
Tea	333,260	362,490	401,970	404,240
Canned food	447,388	535,950	649,160	674,260
Pork	143,950	156,420	143,480	147,540
Vegetable	236,617	282,090	353,090	366,540
Fruit	35,655	59,940	58,730	51,710
Beer	11,043	13,580	20,640	25,180
Flue-cured tobacco	28,111	35,500	41,480	47,660
Goatskin	49,913	34,230	42,330	30,110
Furskin, raw	23,004	47,130	51,600	39,120
Mink skin	37,737	35,920	37,920	33,990
Raw silk	239,695	233,020	308,680	526,930
Cotton	516,807	756,100	718,850	431,150
Cashmere	73,856	127,760	190,610	194,540
Rabbit hair	76,785	156,420	230,390	137,320
Salt	23,619	24,760	14,540	n/a
Oilseeds, edible	243,547	272,490	260,260	248,460
Peanuts and shelled				
peanuts	153,568	182,900	170,220	189,960
Vegetable oil	87,868	30,930	17,370	39,460
Cotton yarn	428,171	535,110	511,770	424,210

1/ 1986 values were converted from Yuan to U.S. dollars using an annual average exchange rate of 3.4528.

Source: China's Customs Statistics, 1986-89.

Appendix table 7--China's major agricultural imports by volume, 1986-89

Item	Units	1986	1987	1988	1989
Food grain	1,000 tons	7,320	16,170	15,330	16,580
Wheat	1,000 tons	5,310	13,200	14,550	14,880
Barley	1,000 tons	420	210	80	na
Rice	1,000 tons	na	na	na	1,200
Corn (maize)	1,000 tons	330	1,540	110	70
Dried beans	1,000 tons	50	40	30	40
Soybeans	1,000 tons	190	280	150	0
Sugar	Tons	1,182,491	1,826,814	3,708,940	1,580,635
Coffee & coffee extracts	Tons	1,832	1,564	2,849	6,170
Cocoa beans	Tons	27,165	14,474	16,777	23,980
Natural rubber	Tons	211,029	214,995	362,150	385,838
Synthetic rubber	Tons	83,751	40,405	40,974	40,289
Logs	1,000 tons	5,729	5,620	na	na
	1,000 cubic meters	na	6,090	9,320	5,970
Cotton	Tons	187	5,976	34,773	519,039
Jute & hemp	Tons	41,023	21,718	750	na
Wool	Tons	152,205	152,503	187,377	104,388
Animal oil & fats	Tons	74,165	111,503	119,839	98,201
Edible vegetable oil	Tons	197,980	521,428	213,721	1,056,156
Other vegetable oil	Tons	272,154	328,283	480,135	781,940
Oilseeds (other than soybeans)	Tons	2,597	685	1,443	na
Fertilizer, manufactured	Tons	5,282,933	10,897,287	14,706,323	13,933,013
Ammonia sulphate	Tons	123,588	48,012	78,507	na
Urea	Tons	2,993,056	5,566,830	8,492,246	7,940,709
Superphosphates	Tons	na	na	na	141,816
Potassium chloride	Tons	na	na	na	1,118,247
Compound fertilizer	Tons	na	na	na	964,647
Agricultural agent (chemicals)	Tons	7,498	10,062	34,142	36,591

na = Not available.

Source: China's Customs Statistics, 1986-89.

Appendix table 8--China's major agricultural imports by value, 1986-89

Item	1986/1	1987	1988	1989
\$1,000 U.S.				
Food grain	1,061,964	1,754,020	1,895,540	2,990,700
Wheat	811,127	1,362,380	1,731,040	2,581,200
Barley	19,300	21,170	8,640	n/a
Rice	na	na	na	304,020
Corn (maize)	65,845	150,530	12,060	9,270
Dried beans	22,110	10,950	11,980	16,480
Soybeans	62,375	61,230	37,080	280
Sugar	223,815	297,440	858,240	429,780
Coffee/coffee extracts	8,460	12,860	17,550	17,930
Cocoa beans	73,201	38,570	34,880	35,500
Natural rubber	166,019	326,740	429,040	376,470
Synthetic rubber	71,310	50,960	59,190	57,240
Logs	609,311	479,760	na	na
	na	na	899,760	589,560
Cotton	156	12,790	58,850	708,710
Jute & hemp	14,742	6,810	320	na
Wool	494,752	543,130	895,540	534,920
Animal oil & fats	21,055	40,680	50,370	39,930
Edible vegetable oils	84,091	186,040	94,820	498,310
Other vegetable oils	73,720	127,740	228,360	341,120
Oilseeds (other than soybeans)	1,034	330	700	na
Fertilizer (mnfctd)	730,998	1,399,230	2,335,490	2,363,650
Ammonia sulphate	9	3,250	6,920	na
Urea	358,857	584,420	1,218,150	1,169,800
Superphosphates	na	na	na	24,010
Potassium chloride	na	na	na	138,230
Compound fertilizer	na	na	na	215,200
Agricultural agent (chemicals)	40,095	55,830	156,270	196,200

1/ 1986 values were converted from Yuan to U.S. dollars using an annual average exchange rate of 3.4528.

Source: China's Customs Statistics, 1986-89.

Appendix table 9--U.S. agricultural exports to China, 1987-89 1/

Item	Fiscal years			Calendar years		
	1987	1988	1989	1987	1988	1989
1,000 tons						
Wheat	898	5,826	8,323	1,916	6,592	7,390
Corn	1,090	217	0	1,251	0	302
Tobacco	0	--	--	0	1	0
Cattle hides, whole 2/	159	127	189	208	130	133
Soybeans	250	179	0	429	0	0
Cotton	1	--	186	--	20	196
Soybean oil	0	0	0	0	0	0
US \$ 1,000						
Wheat	64,743	524,056	1,223,840	139,202	697,838	1,107,125
Corn	81,565	17,602	0	94,926	0	33,527
Tobacco	0	1,180	2,491	0	3,671	0
Cattle hides, whole	7,591	6,786	7,791	10,612	6,214	5,410
Soybeans	50,036	35,859	0	85,895	0	0
Cotton	726	1,328	233,598	248	25,181	258,761
Soybean oil	0	0	0	0	0	0
Others	30,169	25,769	26,489	32,001	26,084	28,270
US \$ million						
Total agricultural	235	613	1,494	362	759	1,433
Total nonagricultural	2,792	4,129	na	3,106	4,262	4,374
Total	3,027	4,742	na	3,469	5,021	5,807

-- = Negligible amounts; na = not available.

1/ U.S. domestic exports, f.a.s.-value basis. Exports include transshipments of agricultural products through Canada. 2/ Numbers in thousands.

Source: U.S. Bureau of the Census, "U.S. Agricultural Exports," country by commodity, monthly printouts; U.S. Department of Agriculture, Economic Research Service, U.S. Foreign Agricultural Trade Statistical Report, various issues.

Appendix table 10--Major U.S. agricultural imports from China, by calendar year, 1985-89 1/

Item	1985	1986	1987	1988	1989
	US \$ 1,000				
Meats and products, excluding poultry	687	24	1,300	380	272
Other meats, fresh or frozen	650	23	1,280	355	155
Poultry and products	15,746	23,265	35,513	31,729	40,408
Eggs	813	1,143	1,206	1,112	1,091
Feathers and down, crude	14,933	22,122	34,303	30,607	39,287
Hides and skins	927	1,080	909	3,625	74
Furskins	690	228	780	1,960	18
Wool, unmanufactured, apparel grades	3,786	2,101	3,615	4,621	3511
Sausage casings	1,191	1,971	2,391	6,280	10,371
Silk, raw	3,433	3,060	4,259	4,744	11,097
All other animal products	16,292	19,528	23,658	20,987	18,085
Grains and feeds	4,743	4,037	4,987	5,079	8057
Fruits and preparations	4,069	4,358	7,415	10,186	8158
Fruits, prepared or preserved	4,060	4,355	7,410	10,169	8021
Nuts and preparations	7,783	7,169	7,352	6,777	10,930
Vegetables and preparations	56,524	53,081	68,800	83,366	97942
Vegetables, prepared or preserved	56,152	52,125	67,043	81,377	93643
Mushrooms, canned	37,553	31,037	41,446	48,522	58941
Waterchestnuts	12,197	13,369	16,393	17,082	15267
Sugar and related products	7,070	11,622	6,298	6,166	9575
Spices	8,905	7,843	7,902	6,048	19239
Beverages	42,014	39,704	35,749	44,658	
Coffee and products	433	452	404	153	135
Cocoa and products	15,243	10,294	6,286	13,994	8814
Tea	18,269	16,469	14,215	20,169	21699
Malt beverages	3,508	5,814	6,895	8,821	5241
Oilseeds and products	2,657	3,687	4,172	6,884	3976
Oilseeds and oilnuts	1,344	1,193	1,004	1,268	1950
Oils and waxes, vegetable	1,311	2,494	3,168	4,112	1997
Seeds, field and garden	1,307	1,579	2,974	3,525	6733
Essential oils	13,309	13,376	13,754	19,321	13924
Drugs, crude natural	6,377	4,637	7,343	8,522	10133
All other vegetable products	3,467	3,874	9,218	10,967	
Total agricultural commodities	197,192	204,278	237,463	279,531	319,468
Total nonagricultural commodities	3,666,208	4,467,222	5,957,837	8,231,369	11,669,032
Total imports	3,863,400	4,671,500	6,195,300	8,510,900	11,988,500

na = Not available.

1/ Imports for consumption, customs-value basis.

Source: U.S. Department of Commerce, Bureau of the Census, "U.S. Agricultural Imports," country by commodity, annual printouts; U.S. Department of Agriculture, Economic Research Service, U.S. Foreign Agricultural Trade Statistical Report, various issues.

Appendix table 11--China's grain trade by country and calendar year, 1984-88

Item	1984	1985	1986	1987	1988
	1,000 tons				
Net grain trade:	7,818	-1,658	50	11,028	10,268
Total exports	2,182	7,717	7,442	5,206	5,094
Total imports	10,000	6,059	7,492	16,234	15,362
Total wheat imports:	9,607	5,626	6,383	13,942	14,872
Argentina	1	875	393	810	na
Australia	2,325	1,241	2,619	4,504	na
Canada	3,187	2,370	2,659	5,968	na
EC	27	324	145	725	na
United States	4,067	816	228	1,566	na
Japan	na	na	137	180	na
Wheat imports:	9,607	5,626	6,114	13,200	14,550
Argentina	1	875	534	810	304
Australia	2,325	1,214	2,616	4,432	397
Canada	3,187	2,370	2,538	5,699	7,532
EC	27	324	145	566	30
United States	4,067	816	226	1,564	5,768
Flour imports:	na	na	167	461	102
Argentina	na	na	0	0	0
Australia	na	na	2	45	0
Canada	na	na	75	167	33
EC	na	na	0	99	na
United States	na	na	1	1	3
Japan	na	na	85	112	57
Rice imports:	na	na	322	541	310
Australia	na	na	0	70	69
Burma	na	na	72	92	0
Korea, DPR	na	na	20	25	0
Thailand	na	na	230	316	253
United States	na	na	0	33	55
Coarse grain imports:	147	120	787	1,752	190
Argentina	0	5	30	143	0
Australia	75	65	42	95	30
Canada	26	0	157	94	52
EC	0	0	0	0	0
Thailand	34	67	509	169	0
United States	0	0	32	1,239	107
Corn imports:	46	80	588	1,541	109
Argentina	na	na	30	143	0
Australia	na	na	0	0	0
Canada	na	na	0	0	0
EC	na	na	0	0	0
Thailand	na	na	509	169	0
United States	na	na	32	1,228	107
Barley imports:	101	40	199	211	81
Australia	na	na	42	95	30
Canada	na	na	157	94	52
EC	na	na	0	0	0
United States	na	na	1	11	0

See footnotes at end of table.

Appendix table 11--China's grain trade by country and calendar year,
1984-88--continued

Item	1984	1985	1986	1987	1988
1,000 tons					
Total grain exports	2,182	7,717	7,442	5,206	5,094
Rice exports:	1,160	1,019	950	1,022	698
Hong Kong	0	0	0	54	106
Iran	175	150	124	175	0
Macau	0	0	0	47	11
Sri Lanka	12	12	11	11	92
United Arab Emirates	0	132	82	10	6
Democratic Yemen	11	9	12	7	31
Benin	0	0	22	0	2
Angola	0	0	0	17	0
Guinea	0	0	21	0	19
Ivory Coast	77	0	81	109	0
Libya	20	30	41	31	20
Mauritius	39	37	50	51	54
France	219	46	11	0	0
Bulgaria	0	10	10	21	0
Czechoslovakia	50	50	41	41	30
German, DR	18	20	30	24	20
Poland	33	70	60	75	60
Romania	34	30	30	50	21
Switzerland	128	162	0	32	24
Brazil	0	3	70	0	0
Cuba	33	50	100	101	50
Peru	0	0	49	93	0
Coarse grain exports	1,022	6,698	6,492	4,184	4,396
Corn exports:	911	6,340	5,640	3,916	3,912
Korea, DPR	na	123	127	89	165
Hong Kong	na	1,046	761	218	238
Japan	na	2,461	2,709	1,600	1,504
Malaysia	na	14	0	20	144
Philippines	na	130	177	61	0
Singapore	na	289	16	42	172
German, FR	na	14	0	15	0
German, DR	na	0	85	21	98
Poland	na	0	104	104	0
USSR	na	1,605	1,603	1,720	1,447
Mexico	na	0	41	24	0
Other grain exports:	111	358	852	268	484
Hong Kong	na	na	140	44	105
Japan	na	na	540	194	294
Singapore	na	na	119	16	40

na = Not available.

Source: Data for 1986-88 comes from China's Customs Administration, Summary Surveys of China's Customs Statistics, Beijing, 1986-88. Data for 1984-85 came from the Almanac of China's Foreign Economic Relations and Trade, 1985-86.

Appendix table 12--China's trade in other agricultural commodities by country, 1987-88

Item	1986	1987	1988
Tons			
Imports:			
Cotton	186	5,976	34,773
Pakistan	0	1,948	20,166
Egypt	0	3,822	1,986
Sudan	0	200	5,113
United States	0	1	940
Sugar	1,114,232	1,760,277	3,351,393
Australia	423,101	408,682	425,750
Cuba	392,779	396,415	1,350,261
Thailand	242,700	678,375	799,242
United States	0	177,164	0
Philippines	0	15,900	0
Exports:			
Cotton	558,089	754,576	468,002
Hong Kong	157,822	189,551	61,353
Indonesia	51,607	57,311	42,740
Japan	103,171	183,194	142,894
USSR	43,714	43,862	7,322
Thailand	17,747	36,434	14,381
E. Europe	73,549	83,424	72,626
Soybeans	1,368,205	1,710,141	1,477,324
Hong Kong	9,108	16,107	39,425
Indonesia	260,413	273,785	308,252
Japan	343,410	296,833	299,484
Malaysia	150,308	126,446	120,799
Singapore	19,916	31,731	57,393
USSR	448,506	816,343	509,762
E. Europe	53,900	28,446	33,920

Sources: China's Customs Statistics, 1986-88.

Appendix table 13--Average annual exchange rate of RMB/U.S. \$, 1979-89

1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
RMB/U.S. \$										
1.55	1.50	1.70	1.89	1.98	2.32	2.94	3.45	3.72	3.72	3.77

Source: International Monetary Fund statistics.

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